Vol. 1107 Number 4

OFFICIAL GAZETTE

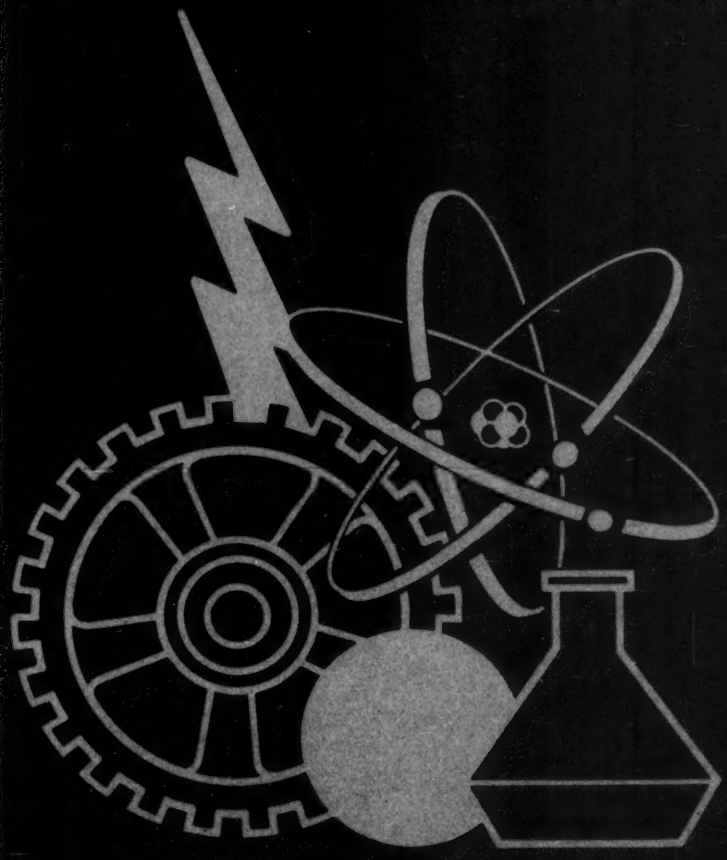
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

October 24, 1989



PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

October 24, 1989 Volume 1107 Number 4

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1107 OG 70
Notice of Maintenance Fees Payable	1107 OG 70
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1107 OG 71
Reissue Applications Filed	1107 OG 72
Requests for Reexaminations Filed	1107 OG 73
Service by Publication	1107 OG 73
Registration to Practice	1107 OG 73
Patent Certificates of Correction	1107 OG 75
Special Boxes for Mail	1107 OG 76
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1107 OG 77
Condition of Patent Applications	1107 OG 79
Reexaminations	1599
Reissue Patents Granted (33,098)	1601
Plant Patents Granted (7,049)	1603
Patents Granted	
General and Mechanical (4,875,235)	1605
Chemical (4,875,900)	1835
Electrical (4,876,413)	1983
Design Patents Granted (304,125)	2101
Index of Patentees	PI 1
Indices of Reissue, Reexamination and Design Plant Patentees	PI 64
Classification of	
Patents (Including Reissues and Reexaminations)	PI 69
Designs, and Plants Applications	PI 72
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 73
Designs and Plant Applications	PI 74
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1040.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

Sept. 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on October 21, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,617,684 through 4,619,002
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on October 19, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,354,279 through 4,355,423
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

" (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or

after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00"

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..... $495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))....$245.00
By other than a small entity....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))....$495.00
By other than a small enttity....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))....$60.00
By other than a small entity....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 6, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,532,656	06/512,599	08/06/85
4,532,668	06/544,532	08/06/85
4,532,687	06/489,673	08/06/85
4,532,689	06/428,168	08/06/85
4,532,690	06/444,351	08/06/85
4,532,705	06/571,066	08/06/85
4,532,714	06/525,207	08/06/85
4,532,717	06/516,924	08/06/85
4,532,722	06/546,823	08/06/85
4,532,734	06/573,855	08/06/85
4,532,737	06/450,197	08/06/85
4,532,741	06/644,546	08/06/85
4,532,765	06/605,476	08/06/85
4,532,768	06/468,635	08/06/85
4,532,769	06/646,962	08/06/85
4,532,783	06/433,981	08/06/85
4,532,784	06/483,538	08/06/85
4,532,789	06/506,583	08/06/85
4,532,796	06/548,939	08/06/85
4,532,797	06/563,890	08/06/85
4,532,812	06/509,520	08/06/85
4,532,815	06/564,619	08/06/85
4,532,826	06/486,784	08/06/85
4,532,831	06/647,467	08/06/85
4,532,834	06/346,003	08/06/85
4,532,839	06/564,817	08/06/85
4,532,844	06/600,262	08/06/85
4,532,850	06/515,651	08/06/85
4,532,852	06/516,556	08/06/85
4,532,857	06/564,092	08/06/85
4,532,860	06/571,688	08/06/85
4,532,861	06/603,714	08/06/85
4,532,867	06/511,602	08/06/85
4,532,868	06/564,209	08/06/85
4,532,872	06/682,442	08/06/85
4,532,878	06/568,616	08/06/85
4,532,879	06/594,086	08/06/85
4,532,899	06/506,983	08/06/85
4,532,911	06/548,658	08/06/85
4,532,912	06/599,588	08/06/85
4,532,916	06/473,203	08/06/85
4,532,917	06/653,923	08/06/85
4,532,936	06/295,073	08/06/85
4,532,938	06/491,607	08/06/85
4,532,948	06/581,728	08/06/85
4,532,961	06/443,704	08/06/85
4,532,965	06/528,119	08/06/85
4,532,967	06/511,106	08/06/85
4,532,972	06/652,227	08/06/85
4,532,977	06/434,620	08/06/85
4,532,987	06/581,794	08/06/85
4,562,989	06/353,394	08/06/85
4,532,999	06/474,668	08/06/85
4,533,010	06/436,276	08/06/85
4,533,013	06/509,377	08/06/85
4,533,014	06/431,209	08/06/85
4,533,018	06/511,483	08/06/85
4,533,019	06/604,527	08/06/85
4,533,021	06/551,930	08/06/85
4,533,023	06/503,990	08/06/85
4,533,025	06/692,328	08/06/85
4,533,029	06/540,355	08/06/85
4,533,032	06/443,839	08/06/85
4,533,038	06/399,801	08/06/85
4,533,051	06/607,233	08/06/85
4,533,063	06/534,455	08/06/85
4,533,065	06/307,833	08/06/85
4,533,072	06/416,843	08/06/85
4,533,077	06/451,922	08/06/85
4,533,084	06/485,527	08/06/85
4,533,085	06/518,749	08/06/85
4,533,091	06/608,701	08/06/85
4,533,097	06/512,798	08/06/85
4,533,103	06/356,388	08/06/85
4,533,108	06/542,614	08/06/85
4,533,111	06/428,528	08/06/85
4,533,117	06/464,811	08/06/85
4,533,121	06/348,970	08/06/85
4,533,129	06/569,276	08/06/85
4,533,131	06/319,747	08/06/85
4,533,139	06/490,438	08/06/85
4,533,142	06/529,349	08/06/85

Patent Number	Serial Number	Issue Date
4,533,145	06/643,245	08/06/85
4,533,146	06/493,958	08/06/85
4,533,150	06/486,850	08/06/85
4,533,151	06/488,142	08/06/85
4,533,162	06/474,407	08/06/85
4,533,163	06/506,619	08/06/85
4,533,170	06/510,676	08/06/85
4,533,183	06/533,078	08/06/85
4,533,185	06/569,061	08/06/85
4,533,200	06/391,211	08/06/85
4,533,202	06/537,069	08/06/85
4,533,223	06/373,631	08/06/85
4,533,224	06/448,494	08/06/85
4,533,226	06/471,635	08/06/85
4,533,227	06/599,772	08/06/85
4,533,237	06/628,802	08/06/85
4,533,240	06/404,517	08/06/85
4,533,253	06/415,447	08/06/85
4,533,258	06/626,585	08/06/85
4,533,260	06/578,655	08/06/85
4,533,268	06/647,865	08/06/85
4,533,271	06/541,156	08/06/85
4,533,275	06/278,240	08/06/85
4,533,277	06/376,946	08/06/85
4,533,288	06/403,054	08/06/85
4,533,289	06/386,256	08/06/85
4,533,293	06/452,022	08/06/85
4,533,300	06/620,898	08/06/85
4,533,301	06/650,998	08/06/85
4,533,304	06/603,892	08/06/85
4,533,306	06/546,857	08/06/85
4,533,307	06/574,357	08/06/85
4,533,311	06/578,572	08/06/85
4,533,322	06/578,278	08/06/85
4,533,324	06/577,783	08/06/85
4,533,330	06/524,355	08/06/85
4,533,336	06/490,235	08/06/85
4,533,351	06/371,969	08/06/85
4,533,360	06/554,492	08/06/85
4,533,379	06/504,349	08/06/85
4,533,380	06/667,507	08/06/85
4,533,396	06/548,840	08/06/85
4,533,421	06/603,760	08/06/85
4,533,438	06/562,504	08/06/85
4,533,451	06/615,437	08/06/85
4,533,452	06/509,585	08/06/85
4,533,487	06/654,902	08/06/85
4,533,491	06/496,679	08/06/85
4,533,492	06/578,626	08/06/85
4,533,495	06/456,075	08/06/85
4,533,516	06/395,283	08/06/85
4,533,522	06/539,614	08/06/85
4,533,526	06/451,674	08/06/85
4,533,544	06/593,525	08/06/85
4,533,548	06/441,630	08/06/85
4,533,555	06/608,591	08/06/85
4,533,560	06/519,910	08/06/85
4,533,583	06/591,236	08/06/85
4,533,590	06/615,374	08/06/85
4,533,605	06/677,886	08/06/85
4,533,609	06/435,844	08/06/85
4,533,638	06/489,660	08/06/85
4,533,639	06/622,431	08/06/85
4,533,651	06/548,887	08/06/85
4,533,655	06/423,138	08/06/85
4,533,657	06/423,139	08/06/85
4,533,658	06/601,889	08/06/85
4,533,664	06/537,592	08/06/85
4,533,669	06/469,548	08/06/85
4,533,675	06/601,314	08/06/85
4,533,676	06/487,799	08/06/85
4,533,726	06/629,376	08/06/85
4,533,739	06/433,922	08/06/85
4,533,743	06/562,123	08/06/85
4,533,746	06/623,460	08/06/85
4,533,763	06/561,615	08/06/85
4,533,765	06/559,078	08/06/85
4,533,766	06/587,654	08/06/85
4,533,772	06/527,352	08/06/85
4,533,773	06/592,284	08/06/85
4,533,783	06/618,440	08/06/85
4,533,787	06/440,999	08/06/85
4,533,789	06/647,878	08/06/85
4,533,794	06/497,297	08/06/85
4,533,804	06/248,321	08/06/85
4,533,831	06/477,375	08/06/85
4,533,834	06/446,143	08/06/85
4,533,844	06/694,895	08/06/85
4,533,857	06/413,394	08/06/85
4,533,861	06/541,762	08/06/85
4,533,869	06/503,593	08/06/85
4,533,874	06/379,479	08/06/85
4,533,890	06/685,547	08/06/85
4,533,893	06/570,489	08/06/85
4,533,897	06/489,342	08/06/85
4,566,904	06/584,117	08/06/85
4,566,907	06/492,577	08/06/85
4,533,922	06/605,161	08/06/85
4,533,939	06/585,968	08/06/85
4,533,946	06/463,003	08/06/85
4,533,958	06/506,967	08/06/85
4,566,964	06/432,384	08/06/85
4,533,980	06/390,691	08/06/85
4,534,006	06/330,650	08/06/85
4,534,015	06/420,000	08/06/85
4,534,021	06/329,374	08/06/85
4,534,037	06/417,882	08/06/85
4,534,042	06/405,927	08/06/85
4,534,045	06/555,745	08/06/85
4,534,060	06/521,729	08/06/85

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S. C. 41(c)(1) and 37 CFR 1,378.

Patent No	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,454,913	06/222,537	06/19/84	01/05/81	09/21/89
4,480,416	06/437,462	11/06/84	10/28/82	09/21/89
4,507,965	06/422,749	04/02/85	09/24/82	09/21/89
4,512,662	06/281,226	04/23/85	07/06/81	09/21/89
4,512,737	06/496,970	04/23/85	05/23/83	09/21/89

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

4,198,451, Re. S. N. 405,280, Filed Sept. 7, 1989, Cl. 428/36,

MARKER LAYUP, Dick E. Johnston, Owner of Record: *Inventor*, Attorney or Agent: William H. Maxwell, Ex. Gp.: 158

4,509,147, Re. S. N. 359,684, Filed May 31, 1989, Cl. 365/190, HIGH SPEED SEMICONDUCTOR MEMORY DEVICE HAVING A HIGH GAIN SENSE AMPLIFIER, Nobuyoshi Tanimura et al., Owner of Record: *Hitachi Ltd. & Hitachi Microcomputer Engineering Ltd., Tokyo, Japan*, Attorney or Agent: Gregory E. Montone, Ex. Gp.: 233

4,547,240, Re. S. N. 405,092, Filed Sept. 6, 1989 Cl. 156, METHOD OF FABRICATING AN ELECTRICAL CONNECTOR, Richard J. Feeny et al., Owner of Record: *FTZ Industries Inc., Simpsonville, S.C.*, Attorney or Agent: John B. Hardaway III, Ex. Gp.: 326

4,643,143, Re. S. N. 406,081, Filed Sept. 12, 1989, Cl. 123/90, VALVE DRIVING MEANS FOR V-TYPE ENGINE OF VEHICLE, Kazuo Uchiyama et al.,Owner of Record: *Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan*, Attorney or Agent: Ernest A. Beutler, Ex. Gp.: 343

4,673,834, Re. S. N. 368,192, Filed June 16, 1989, Cl. 310/71, ENAMELLED WIRE CONNECTION FOR CIRCUIT BOARDS, Guenter Wrobel, Owner of Record: *Papst-Motoren GmbH & Company*, Attorney or Agent: Phillip H. Watt, Ex. Gp.: 212

4,679,780, Re. S. N. 380,838, Filed July 14, 1989, Cl. 267/177, SPRING COMPRESSOR WITH LATCHABLE LOCKING DEVICE, Kenneth D. Kloster, Owner of Record: *Inventor*, Attorney or Agent: Mark J. Sobanski, Ex. Gp.: 314

4,726,398, Re. S. N. 408,159, Filed Sept. 6, 1989, Cl. 137/625.5, HIGH SPEED, HIGH TEMPERATURE THREE-WAY VALVE FOR SWITHCHING HIGH PRESSURE FLUIDS UNDER LOW PRESSURE CONTROL, Robert D. Barree, Owner of Record: *Marathon Oil Company, Findlay, Ohio*, Attorney or Agent: Jack E. Ebel, Ex. Gp: 347

4,763,343, Re. S. N. 404,918, Filed Sept. 8, 1989, Cl. 378/110, METHOD AND STRUCTURE FOR OTIMIZING RADIOGRAPHIC QUALITY BY CONTROLLING X-RAY TUBE VOLTAGE, CURRENT FOCAL SPOT, Nicola E. Yanaki, Owner of Record: *Inventor*, Attorney or Agent: Edel M Young, Ex. Gp.: 256

4,770,698, Re. S. N. 406,063, Filed Sept. 12, 1989, Cl. 75/77, METHOD FOR MAKING LOW ALPHA COUNT LEAD, John A. Dunlop et al., Owner of Record: *Cominco Ltd., Vancouver, Canada*, Attorney or Agent: Neil F. Markva, Ex. Gp.: 111

4,775,513, Re. S. N. 404,853, Filed Sept. 8, 1989, Cl. 422/61, WATER TREATMENT AND SOIL TESTING, Colin E. Marks, Owner of Record: *Wilkinson & Simpson Ltd., Tyne & Wear, England*, Attorney or Agent: Charles B. Rodman, Ex. Gp.: 181

4,794,936, Re. S. N. 405,744, Filed Sept. 11, 1989, Cl. 132/320, COSMETIC SAMPLER, Linda Zango, Owner of Record: *Inventor*, Attorney or Agent: Bernard X. McGready, Ex. Gp.: 333

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,079,028, Reexam. No. 90/001,846, Requested Sept. 19, 1989, Cl. 260/29.6, POLYURETHANE THICKNERS IN LATEX COMPOSITIONS, William D. Emmons, et al., Owner of Record: *Rohm & Haas, Co., Philadelphia, Pa.*, Attorney or Agent: Unknown, Ex. Gp.: 126, Requester: Burns, Doane, Swecker & Mathis, Alexandria, Va.

4,213,163, Reexam. No. 90/001,844, Requested Sept. 12, 1989, Cl. 360/35.1, VIDEO-TAPE RECORDING, Jerome H. Lemelson, Owner of Record: *Jerome H. Lemelson, Princeton, N.J.*, Attorney or Agent: Unknown, Ex. Gp.: 230, Requester: Epson America Inc., Torrance, Calif.

4,438,842, Reexam. No. 90/001,847, Requested Sept. 25, 1989, Cl. 198/838, SLIDE CONVEYOR WITH SIDE STABILIZER, R. L. Alldredge, et al., Owner of Record: *R. L. Alldredge, et al., Denver, Colo.*, Attorney or Agent: Unknown, Ex. Gp.: 310, Requester: Hydroginetics Corp., Arvada, Colo.

4,480,214, Reexam. No. 90/001,845, Requested Sept. 19, 1989, Cl. 315/290, STARTER CIRCUIT FOR GASEOUS DISCHARGE LAMP, Gregory L. Sodini, Owner of Record: *ITT Corp., New York, N.Y.*, Attorney or Agent: Unknown, Ex. Gp.: 260, Requester: Hubbel Inc., Orange Conn.

Service by Publication

A petition to cancel the registration identified below having been filed, and while a notice of such proceeding is being sent by certified mail to registrant at an address supplied by petitioner, namely, 944 Fourth Street, Los Angeles, Calif., the Patent and Trademark Office is not certain whether this is, in fact, registrant's present address. Accordingly, notice is hereby given that unless the registrant listed herin, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, or within forty days from receipt of the notice sent by certified mail, the cancellation will be proceeded with as in the case of default.

Feldman Lighting Company, Los Angeles, Calif., Reg. No. 903,406 for the mark "MARQUEE", Canc. No. 17,729.

ERMA S. BROWN
Administrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

REGISTRATION TO PRACTICE

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. These persons have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before November 24, 1989:

Anderson, Philip E., 10019 Latimer Ct., Fairfax, Va. 22032
Armstrong, Steven J., P.O. Box 1926, New York, N.Y. 10274
Augustyn, John M., 21 East Chestnut, #10F, Chicago, Ill. 60611
Benson, Robert, 30 7th St., N.E., Washington, D.C. 20002
Brody, Christopher W., 703 King St., Alexandria, Va. 22314
Bussan, Matthew J., 5901 Mt. Eagle Dr., Alexandria, Va. 22303
Chwang, Tek Ling, 9922 Chimney Hill La., Dallas, Tex. 75243
Craine, Dean A., 18513 134th Ave., SE, Renton, Wash. 98058
Dellerman, Karen M., 7507 Snowflake Dr., Indianapolis, Ind. 46227
Dohmann, George R., Amberlands Apt., 28-S, Croton-on-Hudson, N.Y. 10520
Elliott, Janet R., 30 Cobblestone Pl., Wilton, Conn. 06897
Ellis, Mary A., 1600 S. Joyce St., #C607, Arlington, Va. 22202
Galloway, Norval B., 420 W. Aldine, #405, Chicago, Ill. 60657

Giori, Claudio, 2975 Orange Brace Rd., Riverwoods, Ill. 60015
Gobrogge, Roger E., 2205 Westbury, Midland, Mich. 48640
Hackett, Nora A., 4318 Pomona Way, Livermore, Calif 94550
Haushalter, Barbara J., 2440 Royal Ridge Dr., Miamisburg, Ohio 45342
Hayes, Christopher T., 5838 Biscayne Dr., Alexandria, Va. 22303
Kalish, Daniel, P.O. Box 41-0101, Charlotte, N.C. 28241
Koval, Melissa J., 527-29 E. 12th St., #A4, New York, N.Y. 10009
Krieger, Daniel J., 4728 N. Virginia Ave., Chicago, Ill. 60625
Lynt, Christopher H., 1316 Janney's La., Alexandria, Va. 22302
McMahon, Stephen T., Star Route, Rural Box 48B, Norwich, N.Y. 13815
Monroe, Bruce M., 3030 Maple Shade La., Wilmington, Del. 19810
Pekar, John A., 9307 Adelaide Dr., Bethesda, Md. 20817
Propp, William W., 330 S. Mentor Ave., #306, Pasadena, Calif. 91106
Schaeffer, Andrew L., 300 Warren Rd., West Chester, Pa. 19382
Sorensen, Andrew D., 1131 N. Hamline, #13, St. Paul, Minn. 55108
Stimpson, Scott D., RFD #2, Box 17, Orrington, Me. 04474
Stocking, Donley J., 1106 N. Quantico St., Arlington, Va. 22205
Townsley, Norton R., 3525 St. Susan Pl., Los Angeles, Calif. 90066
Welsh, John L., 6904 Lemon Rd., McLean, Va. 22101
Werner, David J., One Scott Circle, N.W., #621, Washington, D.C. 20036
Wolfe, James L., 600 N. Campbell, Broken Bow, Okla. 74728
Yorks, Ben J., 4750 Kester Ave., #3, Sherman Oaks, Calif. 91403
Zenger, Todd E., 2818 Wainwright Rd., Salt Lake City, Utah 84109

Sept. 27, 1989

CAMERON WEIFFENBACH,
Director of Enrollment and Discipline

PATENT NOTICES

Certificates of Correction For Week of October 24, 1989

B1. 4,168,315	4,774,536	4,798,350	4,814,998
4,259,680	4,776,319	4,798,597	4,816,167
4,461,199	4,776,714	4,798,849	4,816,759
4,578,800	4,777,143	4,798,939	4,817,033
4,597,667	4,777,276	4,799,293	4,817,268
4,605,321	4,777,425	4,799,568	4,817,691
4,610,916	4,777,615	4,800,619	4,817,770
4,661,002	4,777,913	4,800,979	4,818,176
4,665,062	4,778,165	4,801,296	4,818,226
4,670,343	4,779,418	4,801,597	4,818,656
4,715,388	4,780,049	4,801,616	4,818,905
4,720,560	4,781,727	4,801,770	4,818,928
4,746,770	4,783,603	4,801,888	4,819,209
4,749,477	4,783,671	4,802,195	4,819,452
4,751,269	4,784,735	4,802,484	4,819,584
4,752,588	4,785,249	4,804,051	4,819,954
4,753,902	4,785,437	4,804,961	4,820,320
4,757,069	4,786,641	4,805,108	4,821,201
4,759,508	4,787,785	4,805,304	4,821,461
4,759,632	4,788,153	4,807,024	4,822,247
4,759,917	4,788,365	4,807,399	4,824,814
4,760,596	4,789,221	4,807,558	4,825,325
4,761,520	4,790,024	4,807,708	4,827,264
4,762,925	4,791,571	4,807,958	4,827,482
4,763,782	4,792,524	4,808,249	4,827,638
4,765,099	4,793,052	4,809,009	4,828,526
4,766,381	4,793,438	4,810,203	4,829,060
4,767,824	4,793,722	4,810,332	4,829,840
4,769,293	4,793,941	4,810,340	4,830,103
4,771,778	4,794,306	4,811,361	4,830,227
4,772,822	4,794,609	4,811,530	4,830,343
4,773,384	4,795,270	4,811,578	4,832,051
4,773,827	4,796,092	4,812,266	4,833,544
4,773,966	4,796,359	4,812,277	4,836,792
4,774,255	4,796,567	4,812,312	4,839,049
4,774,305	4,797,095	4,813,671	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institite of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 376
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State University	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775

Reference Collection of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

State	*Name of Library*	*Telephone Contact*
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 572-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF September 23, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	7-30-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	5-4-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-26-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director	7-2-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	1-12-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during September 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,688,314 to 3,694,813 inclusive
Plant Patents ..... None

REEXAMINATIONS

OCTOBER 24, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B2 3,415,374 (1145th)
METHOD AND APPARATUS FOR VORTICAL SEPARATION OF SOLIDS

Nils A. L. Wikdahl, Djursholm, Sweden, assignor to Noss Company

Reexamination Request No. 90/001,670, Dec. 15, 1988.
Reexamination Certificate for Patent No. 3,415,374, issued Dec. 10, 1968, Ser. No. 398,496, Sep. 23, 1964.
Reexamination Certificate B1 3,415,374, issued Dec. 27, 1988.
Filed Dec. 15, 1988, Ser. No. 398,496
Int. Cl.[4] B04C *9/00*
U.S. Cl. 209—211

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–14 is confirmed.

1. A method of separating a suspension into a light fraction and a heavy fraction in a hydrocyclone separator assemblage including a plurality of hydrocyclone separators disposed in several superimposed layers and with their geometric axes in an at least substantially horizontal orientation, each of said separators including an elongate chamber of circular cross-section having at one end a first outlet for the discharge of light fraction into a first receptacle common to all separators and at the other end a second outlet for the discharge of heavy fraction into a second receptacle also common to all separators, said assemblage further including conduits for discharging the light fraction and the heavy fraction from the first and the second receptacle respectively, and a common suspension supply container for feeding suspension in tangential direction into said chamber of the separators, said method comprising the steps of discharging under pressure the heavy fraction into said second receptacle when the separator asseblage is in operation, and controlling the discharge of the light fraction and the heavy fraction from said first and second receptacles respectively so as to maintain the operational levels of the light fraction and the heavy fraction respectively in said receptacles at least at substantially the same height and above said heavy fraction outlets of the hydrocyclone separators in the uppermost one of said layers.

B1 4,246,033 (1146th)
ARRANGEMENT FOR APPLYING WRITTEN OR DRAWN INFORMATION ONTO IMAGE CARRIERS FOR OVERHEAD PROJECTION

Rene von Wartburg, Rhine, Switzerland, assignor to Pelikan AG, Hanover, Fed. Rep. of Germany

Reexamination Request No. 90/001,467, Mar. 2, 1988.
Reexamination Certificate for Patent No. 4,246,033, issued Jan. 20, 1981, Ser. No. 847,114, Oct. 31, 1977.
Filed Mar. 2, 1988, Ser. No. 847,114
Claims priority, application Switzerland, Nov. 23, 1976, 14716/76
Int. Cl.[4] C09D *11/00, 11/04, 11/16*
U.S. Cl. 106—23

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–7 are cancelled.

New claim 8 is added and determined to be patentable. ps

[6. The combination as defined in claim 1 wherein the color producing the material is a blue compound and the colorless material is effective to react with the blue compound to form a yellow color.]

B1 4,510,193 (1147th)
FILTER SHEET MATERIAL

Hubert Blücher, Freytagstrasse 45; Hasso von Blücher, Sohnstrasse 58, both of, D-4000 Düsseldorf, and Ernest de Ruiter, Höhenstrasse 57a, D-5090 Leverkusen 3, all of Fed. Rep. of Germany

Reexamination Request No. 90/001,730, Mar. 13, 1989.
Reexamination Certificate for Patent No. 4,510,193, issued Apr. 9, 1985, Ser. No. 496,742, May 20, 1983.
Filed Mar. 13, 1989, Ser. No. 496,742
Claims priority, application Fed. Rep. of Germany, Feb. 9, 1983, 3304349
Int. Cl.[4] B32B *3/16, 27/14*
U.S. Cl. 428—196

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 2 is cancelled.

Claim 1 is determined to be patentable as amended.

Claims 3–15 and 16, dependent on an amended claim, are determined to be patentable.

1. A filter sheet material comprising an air-permeable textile material, an adhesive uniformly covering about 20 to 80% of the surface of the textile, the applied adhesive having a height of about 0.05 to 0.5 mm and a diameter or width of about 0.1 to 5 mm, and about 10 to 250 g/m^2 of activated carbon adsorber particles anchored to the textile by the adhesive, the carbon particles having an internal surface of at least about 600 m^2/g and a diameter of at least about 0.1 mm, the adhesive being a masked isocyanate prepolymer which is crosslinked to form a polyurethane by means of a crosslinking agent for the isocyanate after spreading the carbon particles on the textile material with the applied adhesive.

B1 4,588,627 (1148th)
DEFLECTOR FOR VEHICLE BODY COMPONENTS

Robert A. Isaksen, Chardon; David E. Frappier, Chagrin Falls, and Wallace R. Jones, Waite Hill Village, all of Ohio, assignors to The Excello Specialty Company, Ohio

Reexamination Request No. 90/001,532, Jun. 20, 1988.
Reexamination Certificate for Patent No. 4,588,627, issued May 13, 1986, Ser. No. 606,900, May 3, 1984.
Continuation-in-part of Ser. No. 415,228, Sep. 7, 1982, Pat. No. 4,469,732. This application Jun. 20, 1988, Ser. No. 606,900
The portion of the term of this patent subsequent to Sep. 4, 2001, has been disclaimed.
Int. Cl.[4] B32B *3/02, 3/10*
U.S. Cl. 428—80

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 21–28 is confirmed.

Claims 1–20, 29–34 are cancelled.

21. A reusable deflector for application to the inner panel of a vehicle door to prevent water or dust and the like from

entering the vehicle body or coating the inner door trim panel, the deflector comprising:

a flat and flexible sheet of a plastic material having a peripheral shape generally matching the peripheral configuration of the inner panel of the vehicle door, said sheet having top, bottom and opposing side edges; permanently tacky pressure-sensitive adhesive bonded to a first face of said sheet, said layer being disposed in strips generally along said edges; at least one tab provided along said bottom edge adapted to be inserted into a slot in an associated inner door panel; and, a strip of plastic material having an adhesive coated face temporarily secured to said sheet in a first storage position and adapted to be secured to said sheet in a second position over said one tab when said one tab is inserted into a slot in an associated inner door panel.

B1 4,607,518 (1149th)

FORGING PRESS OF UNDERFLOOR DESIGN

Hans A. Schubert, Düsseldorf, and Klaus Schulze, Monchen-Gladbach, both of Fed. Rep. of Germany, assignors to SMS Hasenclever Maschinenfabrik GmbH

Reexamination Request No. 90/001,752, Apr. 17, 1989.
Reexamination Certificate for Patent No. 4,607,518, issued Aug. 26, 1986, Ser. No. 746,323, Jun. 19, 1985.
Filed Apr. 17, 1989, Ser. No. 746,323
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1984, 3422644
Int. Cl.[4] B21J *9/12*
U.S. Cl. 72—453.12

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–11** are determined to be patentable as amended.

1. **[**A**]** *In a* forging press of underfloor design comprising a static platen, a travelling frame formed by an upper travelling crosshead, a lower travelling crosshead and columns inter-connecting the **[**said**]** travelling crossheads, a guide shaft connected to *and depending from* the platen and acting as a guide for the lower travelling crosshead, at least one working piston-cylinder unit acting between the **[**platten**]** *platen* and the lower travelling crosshead for exerting forging pressure, and retraction piston-cylinder units acting between the **[**platten**]** *platen* and the upper travelling crosshead for retracting the travelling frame, **[**characterised in that**]** *the improvement wherein* the guide shaft is **[**made**]** hollow **[**and serves as the**]** *to provide the* cylinder **[**for the working piston**]** of **[**the**]** said working piston-cylinder unit, the lower travelling crosshead is *provided with an aperture which encircles the hollow guide shaft and through which the hollow guide shaft extends downwardly, said lower travelling crosshead is* guided on **[**the**]** said hollow guide shaft, *the lower travelling crosshead has a lower end, a bridge member is provided on said lower end of the lower travelling crosshead spanning said aperture,* and the working piston *of the working piston-cylinder unit* is guided in **[**the**]** *said* cylinder **[**cavity**]** of **[**the**]** said hollow guide shaft and is supported on **[**the lower travelling crosshead**]** *said bridge member* by means of *ball and socket joints and* a thrust rod interposed between *said* ball-and-socket joints.

REISSUES

OCTOBER 24, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

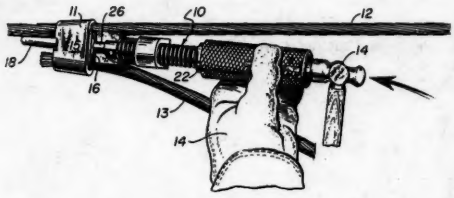
Re. 33,098
EXPLOSIVELY-OPERATED TOOL

Warren A. Center, Alton Bay, N.H., assignor to Burndy Corporation, Norwalk, Conn.

Original No. 4,722,189, dated Feb. 2, 1988, Ser. No. 914,332, Oct. 2, 1986. Application for reissue Mar. 14, 1989, Ser. No. 323,429

Int. Cl.[4] F01B *29/08;* **F02N** *13/00*

U.S. Cl. 60—635 **23 Claims**



22. Explosive cartridge, comprising:

(a) an elongated shell case having a longitudinal main bore opening on one end and a communicating smaller bore opening on the other end,

(b) a bushing having a cylindrical portion at one end slidable in the smaller bore and a second cylindrical portion at the other end slidable in the longitudinal main bore, the bushing having a coaxial bore extending through it,

(c) a power cell having a cylindrical main body fitting snugly in the coaxial bore of the bushing and a radial flange at one end to engage the other end of the bushing, the power cell having internal explosive material and primer that is actuated at the said one end of the cell having the flange, and

(d) a piston slidably carried in the main bore and having a recess facing the bushing and the power cell.

Re. 33,099
DENTAL CROWN, COPING AND METHOD

Itzhak Shoher, 50 Shlomo Hamelich St., Tel Aviv, and Aharon Whiteman, 13 Jl Perez St., Petach Tikvah, both of Israel

Original No. 4,459,112, dated Jul. 10, 1984, Ser. No. 414,415, Sep. 2, 1982. Application for reissue Jun. 4, 1986, Ser. No. 870,427

Int. Cl.[4] A61C *5/08*

U.S. Cl. 433—222.1 **20 Claims**

1. A [jacket] *dental* crown comprising a composite body [including] *formed from* a thin foil of high fusing temperature metal having a surface geometry conforming to a die to which it has been adapted [with the foil having at least a minimum of three folded over pleats with each pleat forming a triangular like flap in the unfolded position,] a thin coating of a [noble] *gold* based *noble* metal composition superimposed over one surface of said [thin metal foil and disposed beneath the folded over pleats] *high fusing temperature metal with said composite body having a plurality of folded over sections which radially extend from an axis through the center of the foil in a symmetrical arrangement about the center of the foil* and a relatively thick outer coating of a dental veneering material.

Re. 33,100
DENTAL COMPOSITIONS INCORPORATING GLASS IONOMERS

Robert L. Ibsen, Santa Maria; William R. Glace, Orcutt, and Donald R. Pacropis, Santa Maria, all of Calif., assignors to DEN-MAT Corporation, Santa Maria, Calif.

Original No. 4,738,722, dated Apr. 19, 1988, Ser. No. 907,577, Sep. 15, 1986. Application for reissue Jun. 29, 1988, Ser. No. 212,951

Int. Cl.[4] A61K *6/06;* **C08L** *33/02*

U.S. Cl. 106—35 **7 Claims**

1. A buffered glass ionomer cement for dental use, including in combination, a mixture of

(A)(1) a fine particle, 5–10 microns, powder consisting essentially by weight

silica	20–30%
boron oxide	1–10%
aluminum oxide	10–20%
aluminum fluoride	1–10%
calcium fluoride	30–40%
phosphorus pentoxide	[1–5%] *1–10 %*
ammonium fluoride	[1–10%] *1–5%*

said powder being obtained from glass resulting from the fusing together of said silica, boron oxide, aluminum oxide, aluminum fluoride, calcium fluoride, phosphorus pentoxide, and ammonium fluoride, then fritting and ball milling to the fine particle size, 5–10 micron, powder, and

(2) five to twenty percent of the weight of (1) of powdered zinc oxide and zero to ten percent of powdered titanium dioxide, added to said powder (1) and mixed therewith only after said fritting and ball milling, and

(B) a liquid component comprising, by weight

(1) 100–80% by weight of polyacrylic acid of low molecular weight, 40% solution in water and

(2) 0–20% of d-tartaric acid,

said powder component (A) and said liquid component (B) being mixed together in a ratio of from 1:1 to 5:3 by weight.

Re. 33,101
METHOD OF FORMING THE PRIMARY CORE OF A PRESTRESSED CONCRETE PIPE

Vito Nenna, P.O. Box 377, Pittstown, N.J. 08867

Original No. 4,600,548, dated Jul. 15, 1986, Ser. No. 457,009, Jan. 10, 1983. Application for reissue Apr. 21, 1988, Ser. No. 184,283

Int. Cl.[4] B28B *1/10;* **B29C** *39/12*

U.S. Cl. 264—71 **10 Claims**

1. A method of forming [an adherent concrete lining on the inside surface of a cylindrical metal pipe and an adherent concrete casing about the outside surface of the metal sleeve] *the primary core of a prestressed concrete pipe* comprising the steps of:

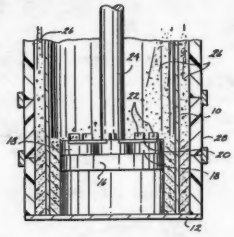
(a) positioning a cylindrical metal sleeve having *a substantially fluid impervious side wall and* a predetermined height in substantially vertical and coaxial relationship within a cylindrical mold having substantially the same height as

the metal sleeve such that the outer surface of the metal sleeve is spaced from the inner surface of the mold;

(b) supplying concrete to the space between the outer surface of the metal sleeve and the inner surface of the mold while vibrating the mold to compress the concrete therebetween to form an adherent concrete casing about the outer surface of the metal sleeve;

(c) simultaneously with step (b), supplying *a zero slump* concrete to the interior of the metal sleeve;

(d) simultaneously with step (b), radially compressing the concrete in the metal sleeve against the inner surface thereof to form a concrete lining along the length of the inner surface of the metal sleeve; and



(e) removing the metal sleeve having the inner concrete lining and the outer concrete casing from the mold.

PLANT PATENTS

GRANTED OCTOBER 24, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,049

NECTARINE TREE (SUMMER BRIGHT)

Norman G. Bradford, 11875 E. Savana Rd., and Lowell G. Bradford, 12439 E. Savana Rd., both of Le Grand, Calif. 95333

Filed Dec. 12, 1988, Ser. No. 283,819
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—41 1 Claim

1. A new and distinct mid-seasonal ripening variety of clingstone nectarine tree, substantially as illustrated and described, which most nearly resembles the Summer Diamond (U.S. Pat. No. P.P. 5,654) nectarine variety by producing fruit that is nearly full red in color and very firm in texture, but is distinguished from and an improvement on that variety by having fruit that ripens 5 days earlier, that is clingstone instead of freestone, and that is much sweeter in flavor, a valuable asset in today's marketplace.

7,050

NECTARINE TREE (DIAMOND JEWEL)

Norman G. Bradford, 11875 E. Savana Rd., and Lowell G. Bradford, 12439 E. Savana Rd., both of Le Grand, Calif. 95333

Filed Dec. 12, 1988, Ser. No. 283,820
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—41 1 Claim

1. A new and distinct early ripening variety of clingstone nectarine tree, substantially as illustrated and described, which most nearly resembles the May Diamond (U.S. Plant Pat. No. 5,454) nectarine variety by producing fruit that is full red in color, ripens in early June, and is very firm in texture, but is distinguished from and an improvement on that variety by having fruit that is clingstone instead of freestone and that is much sweeter in flavor, both being valuable assets in today's marketplace.

PATENTS

GRANTED OCT. 24, 1989

ERRATA

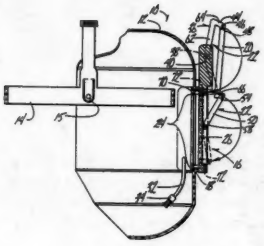
For CLASS	See PATENT NO.
180-233	4,875,698
297-181	4,875,732
376-146	4,875,945
071-090	4,876,044
260-397	4,876,045
008-111	4,876,046
562-041	4,876,047
556-415	4,876,337
514-570	4,876,366
219-010	4,876,423
361-540	4,876,451
342-383	4,876,489
360-104	4,876,623
358-056	4,876,721
428-645	4,877,696
428-034	4,877,705
548-336	4,877,801
525-146	4,877,813
252-344	4,877,842
544-227	4,877,873
528-272	4,877,922
219-381	4,877,990
371-005	4,878,049
367-137	4,878,210
374-166	4,878,226

PATENTS

GRANTED OCTOBER 24, 1989

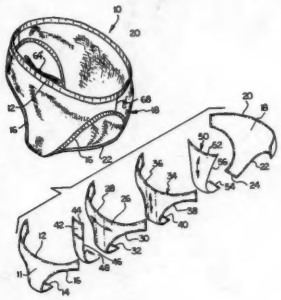
GENERAL AND MECHANICAL

4,875,235
WELDER'S MASK WITH BREATH CONTROLLED EYE SHIELD
Thomas E. Kuhlman, R.R. 7748, Spirit Lake, Iowa 51360
Filed Jul. 27, 1988, Ser. No. 224,667
Int. Cl.[4] A61F *9/06*
U.S. Cl. 2—8 **19 Claims**



1. A welder's mask having a breath controlled eye shield which is efficient in size, weight, and operation comprising:
- a mask housing having a viewing opening and means for mounting the mask housing upon the head of a user;
- a modular, self-contained breath controlled eye shield means, having mounting means for adaptable and removable positioning on the mask housing and viewing opening, and including;
- a welder's eye shield being movable between a closed position sealing and covering the viewing opening and an open position uncovering the viewing opening in the mask housing;
- a motor means having a drive-shaft and being mounted in the eye shield means and operatively connectable to a power source mounted in the eye shield means, the motor means having connective linkage means attached between the eye shield and the motor means, drive-shaft of the motor means being operable in the first and second rotational directions to move the connective linkage means to correspondingly move the eye shield to any resting position between and including the open and closed positions;
- a switch means operatively connected to the motor means for controlling operation of the motor means int he first and second rotational directions for the drive-shaft, said switch means comprising:
- enclosed chamber means including first and second apertures;
- a hose connected in fluid communication to the first aperture;
- a resilient diaphragm sealing and covering the second aperture;
- an electrically conductive element, external of the enclosed chamber means, movable between first and second conducting positions;
- a stem, external of the enclosed chamber means, connected between the electrically conductive element and the diaphragm;
- so that when exhaled air from the user is introduced into the hose, the pressure inside the air chamber increases and flexes the diaphragm outwardly causing the stem to push the electrically conductive element towards the first conducting position, and inhaling causes a reduction in air pressure in the air chamber int urn causing inward flexing of the diaphragm, the stem pulling the electrically conductive element towards the second conducting position, the change of the conductive element between the first and second conducting positions electrically switching the operation of the motor means between the first and second rotational directions.

4,875,236
SWIM SUIT CONSTRUCTION
Nancy V. Boynton, 5814 Vestavia Dr., Houston, Tex. 77069
Filed Nov. 5, 1987, Ser. No. 117,488
Int. Cl.[4] A41D *7/00*; A61F *5/40*
U.S. Cl. 2—67 **7 Claims**



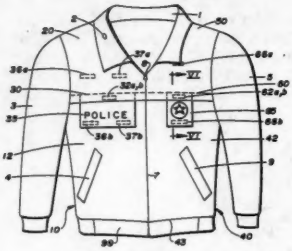
1. A brief-type garment for securely supporting a person while allowing freedom of movement, comprising:
- a front outer shell of a stretch fabric stretchable in at least one direction, having an upper edge, side edges, and a lower edge;
- a first liner of one-way horizontally stretchable fabric having the same general shape as said front outer shell, said first liner being attached to said front outer shell along the upper edge, side edges, and bottom edge thereof;
- an outer support member of one-way horizontally stretchable fabric having upper, lower, and side edges attached at least along the upper edge and lower edge of said outer shell and first liner;
- a second liner of one-way vertically stretchable material having the same general shape as said outer shell attached to said outer shell and first liner along said top edge, side edges, and bottom edge thereof; and
- a rear outer shell having an upper edge, side edges, and a bottom edge, said rear shell being attached to said side edges and bottom edges of said front outer shell and said first liner.

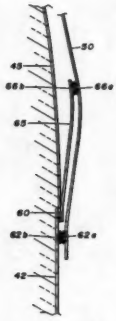
4,875,237
JACKET FOR DISPLAYING INFORMATION
Stephen Cohen, 1532 15th Ave. W., Seattle, Wash. 98119
Filed May 31, 1988, Ser. No. 200,434
Int. Cl.[4] A41D *1/02*
U.S. Cl. 2—94 **3 Claims**

1. A jacket having an attached collar and sleeves, comprising:
- (a) a pair of front panels attached to a waistband and to a shoulder seam, each said front panel further comprising an upper front panel, a lower front panel, and a front vent

panel, said upper front panel interconnected to said lower front panel along a first front panel seam, said front vent panel having an inside surface and an upper edge attached to said shoulder seam and two said edges attached to said collar and said sleeve and a lower edge which extends over and releasably engages said upper front panel, said front vent panel overlaying said upper front panel, whereby an accessible, upward-extending vent pocket is formed; and

(b) a rear panel attached to said waistband and to said pair of front panels at said shoulder seam, said rear panel further comprising an upper rear panel and a lower rear panel and a rear vent panel, said upper rear panel interconnected to said lower rear panel along a rear panel seam, said rear vent panel having an inside surface and an upper edge





attached to said shoulder seam, two side seams attached to said sleeves and a detachable lower edge which extends downwardly over said rear panel seam, said rear vent panel overlaying said upper rear panel, whereby an accessible, upward-extending vent pocket is formed; and

(c) at least one rectangular informational display means having an attached edge and a detachable edge, said attached edge being attached to said front panel seam; and

(d) a hook and loop connector attaching said detachable edge of said informational display means to said inside surface of said front vent panel, whereby said jacket may be easily converted from a conventionally appearing jacket to a jacket with exposed informational display means by detaching said informational display means at said hook and loop connector and extending said informational display means downwardly from said vent pocket.

4,875,238

MUSICAL GARMENT

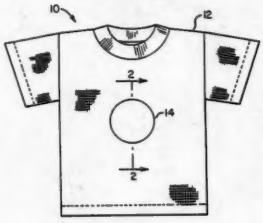
Ruth Solomon, 500 Kingsridge Dr., Ballwin, Mo. 63011, and Harvey J. Rosenberg, 217 S. Green Trails, Chesterfield, Mo. 63017

Filed Sep. 15, 1988, Ser. No. 244,872
Int. Cl.[4] A41B *1/02*
U.S. Cl. 2—115 **4 Claims**

1. A garment capable of playing a musical tune comprising a garment having incorporated into its fabric a musical element comprising a memory chip, a battery and a speaker, wherein said element plays a musical tune when depressed;

said garment being a garment selected from the group consisting of T-shirt, sweat shirt, sweat pants, pants, sweater, jersey, shorts and socks;

said garment being machine washable such that said musical



element maintains operability after said garment is washed; and

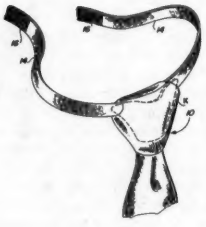
wherein said machine washable feature of said garment is obtained by maintaining said musical element in the interior of a machine washable pouch, and wherein said machine washable pouch is sewn into the fabric of said garment.

4,875,239

PRE-TIED NECKTIE

John A. Patterson, Jr., 204 College Ave., Fruitland Pk., Fla. 32731

Filed Aug. 9, 1988, Ser. No. 230,306
Int. Cl.[4] A41D *25/02, 25/14*
U.S. Cl. 2—152 R **14 Claims**



1. A necktie knot support assembly for supporting a fabric pre-tied necktie for wearing about a user's neck, said assembly comprising:

a main body member having a pair of rearwardly and opposite sidewise directed wings connected by a central curved bridging wall, and shaped to determine the formation of a knot of said necktie;

a support strap having ends and a central portion;

means located on said body member for engaging said central portion of said strap to align said strap with said body member so that said ends of said strap extend respectively outwardly from said body member in alignment with said wings; and

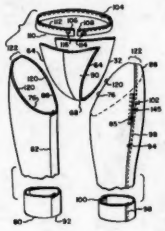
means located on said ends for releasably securing said ends to one another about said user's neck.

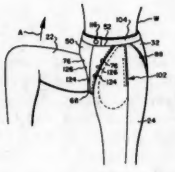
4,875,240

PANTS CONSTRUCTION AND ASSOCIATED METHOD

Joseph B. Barrett, 192 Moore Ave., Kenmore, N.Y. 14217

Filed Jan. 5, 1988, Ser. No. 141,116
Int. Cl.[4] A41D *1/06, 27/20*
U.S. Cl. 2—227 18 Claims





1. A pair of pants comprising:

panel means for covering the front and back lower portion of a wearer's torso, said panel means including a symmetrical hourglass shaped panel which, when placed in a planar, spread condition, defines two relatively broad edges at opposite ends thereof and a pair of curved generally C-shaped side edges extending between said broad end edges, said side edges being arranged relative to one another so that the Cs thereof open generally away from one another and so that a neck region is defined about midway between the broad edges, said hourglass-shaped panel being positionable about the wearer's torso when the pants are operatively worn so that said neck region is arranged beneath the wearer's crotch, one of said broad edges is arranged in front of the wearer and generally along the wearer's waistline and the other of said broad edges is arranged in back of the wearer and generally along the wearer's waistline;

a pair of leg sections each including a tube-like portion defining an upper endless edge for encircling a corresponding one of the wearer's legs adjacent the top thereof, each of said endless upper edges being joined to a corresponding one of said C-shaped edges and along the entire length thereof to operatively join said leg section to said panel means; and

waistband means extending along both of said broad edges of said panel means and along a portion of each of said upper endless edges of said leg sections and including connecting means so that said pants fit around the waist of the wearer.

16. A method of constructing a pair of pants comprising the steps of:

providing panel means for covering the front and back lower portion of the wearer's torso including a symmetrical hourgalss-shaped panel which, when in a planar, spread condition, defines two relatively broad parallel edges at opposite ends thereof and a pair of curved generally C-shaped side edges extending between said broad edges, said side edges being arranged relative to one another so that the Cs thereof open generally away from one another and so that a neck region is defined substantially midway between the broad edges;

providing a pair of leg sections each including a tube-like portion defining an endless upper edge for encircling a corresponding one of the legs adjacent the top thereof;

joining each of said endless upper edges of said leg sections to a one corresponding one of said C-shaped edges of said panel means and along the entire length of the corresponding C-shaped edges to operatively join said leg sections to said panel means and so that when said pants are operatively worn, said neck region is arranged beneath the wearer's crotch, one of said broad edges is arranged in said front of the wearer and generally along the wearer's waistline and the other of said broad edges is arranged in back of the wearer and generally along the wearer's waistline; and

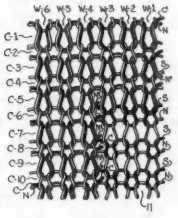
providing waistband means extending along both of said broad edges of said panel means and along a portion of each of said upper endless edges of said leg sections and including connecting means so that said pants fit around the waist of the wearer.

4,875,241

PANTYHOSE WITH PANTY HAVING COTTON CHARACTERISTICS

George A. G. Browder, Jr., Germantown, Tenn., and David W. Grant, Grenada, Miss., assignors to Esmark Apparel, Inc., New York, N.Y.

Filed Oct. 14, 1988, Ser. No. 257,840
Int. Cl.[4] A41B *11/04*
U.S. Cl. 2—409 8 Claims

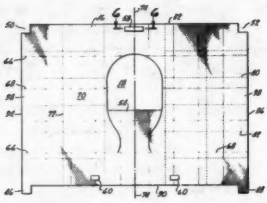


1. A pantyhose including sheer legs and a relatively heavier and more opaque panty portion, said panty portion including the feel and moisture absorbing characteristics of cotton and comprising successive courses formed of adjacent wales of stitch loops, alternate single courses of said panty portion being knit of a thermoplastic yarn and a cotton yarn in plated relationship with said thermoplastic yarn, and intervening single courses of said panty portion being knit of a thermoplastic yarn and a spandex yarn in plated relationship with said thermoplastic yarn, said cotton yarn providing the feel and moisture absorbing characteristics of cotton to said panty portion and said spandex yarn providing stretchability to said panty portion.

4,875,242
COMPACT TOILET SEAT COVER

Leonard N. Albrecht, Irvine, and Steven R. Burke, Huntington Beach, both of Calif., assignors to Alvin S. Haining and Katherine R. Haining, both of Mission Viejo, Calif.

Continuation-in-part of Ser. No. 112,866, Oct. 23, 1987, abandoned. This application Nov. 4, 1987, Ser. No. 116,857
Int. Cl.[4] A47K *13/16*
U.S. Cl. 4—243 16 Claims



1. A disposable paper cover for conventional toilet seats, the cover comprising:

(a) a composite paper sheet which disintegrates when immersed in water sufficiently that it may be flushed in the toilet without creating problems with the toilet pumping or with any conventional septic tank connected with the plumbing, the paper sheet being of generally rectangular configuration, of adequate size to cover the toilet seat, and having an opening formed centrally therein for general registration with the toilet opening defined by the conventional toilet seat;

(b) said composite paper sheet including a top layer of creped paper emboss laminated with a bottom layer of flat machine finished or machine glazed finished paper, whereby to preserve the structural strength of the sheet while enhancing its weight and its self-stability on the toilet seat without substantial interference with its disintegration in water; said rectangular sheet having rear and forward margins and lateral margins extending therebetween;

(c) adhesive means disposed on the bottom layer of paper proximate the rear margin and centrally between the lateral margins of the sheet for releasably anchoring the sheet to the rear portion of the conventional toilet seat; and,

(d) said composite sheet being folded into a compact configuration, in which:

(1) the adhesive means is exposed for application to the rear portion of the toilet seat; and,

(2) the forward margin of the composite sheet is accessible for

(A) grasping with the hands at locations proximate the lateral margins of the sheet, and

(B) pulling against the anchor provided by said adhesive and separating the hands,

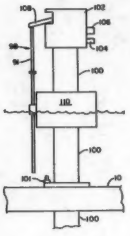
(C) with folds being configured to unfold upon such pulling followed by such separation thereby to extend the sheet over the toilet seat with the bottom layer in contact with the toilet seat and the top layer thereof exposed for direct contact with the body of the user;

(3) whereby, to facilitate the deployment of the sheet on the toilet seat without requiring direct contact between the user's hands and the toilet seat.

4,875,243
TOILET APPARATUS WITH AUTOMATIC SELF-CLEANING MEANS

Ben C. Wileman, III, Oklahoma City, Okla., assignor to Wileman Industries, Inc., Oklahoma City, Okla.

Continuation-in-part of Ser. No. 147,873, Jan. 25, 1988, and Ser. No. 874,667, Jun. 16, 1986, Pat. No. 4,745,639. This application May 5, 1988, Ser. No. 190,343
Int. Cl.[4] E03D *5/04;* A47K *13/00*
U.S. Cl. 4—662 3 Claims



1. A toilet apparatus comprising a bowl, a holding tank in communication with said bowl by fluid communication means, a seat member connected to said bowl and adapted to overlie a rim portion of said bowl, a cover member connected to said bowl and adapted to overlie said seat member, at least one of said seat and cover members having channel means therein and hole means extending from said channel means to an undersurface thereof to facilitate passage of fluid from said holding tank, through said fluid communication means and through said channel and hole means, a flotation body disposed in said holding tank, said fluid communication means being operative in response to manual manipulation of a flushing activator to empty fluid in said holding tank into said bowl, said flotation body being adapted to move with movement of fluid level in said holding tank, a manifold disposed in said holding tank, a fluid supply pipe connected to said holding tank, and in communication with said manifold valve and conduit means disposed on said apparatus and operable by descending movement of said flotation body relative to said manifold to activate flow of fluid from said fluid supply pipe, through said manifold, to said channel and hole means, a first switch means disposed in the path of said flotation body and engageable by said flotation body in said descending movement, said first switch means being adapted to operate said valve and conduit means to stop said flow of fluid to said channel and hole means and direct flow of fluid to refilling said holding tank, said flotation body being adapted to rise with said fluid in said holding tank to disengage from said switch and to activate said manifold to close off flow of fluid from said supply pipe.

4,875,244
SOFA BED CONSTRUCTION

Gilles Tremblay, Quebec, Canada, assignor to Futonair Quebec, Inc., Quebec, Canada

Filed Mar. 18, 1988, Ser. No. 170,287
Claims priority, application Canada, Mar. 27, 1987, 533191
Int. Cl.[4] A47C *17/16*
U.S. Cl. 5—37 R 1 Claim

1. A wooden furniture frame adaptable to be converted between sofa and bed positions, comprising:

a substantially rectangular back piece means having opposed first side segments connected by opposed upper and lower cross bars, said first side segments having extension segments which extend beyond a lower cross bar;

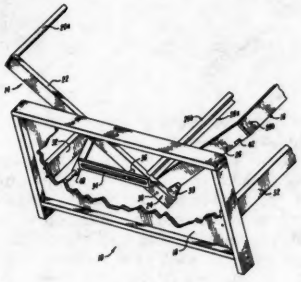
a rectangular seat piece means having opposed second side segments connected by opposed forward and rearward cross bars, the rearward portion of the second side segments being positioned within and pivotally hinged to the extension segments of the back piece means;

opposed armrest stand means connected by support frame means to support said back support frame and said seat support frame;

dowel means extending from the first side segments of the back support frame;

elongate, horizontally disposed groove means, attached to an interior portion of said armrest stand means for slidably receiving said dowel means;

block means pivotally secured to the outer surfaces of said second side segments of the seat piece means, having a base portion and being adapted to engage a top surface of said extension segment with said base portion when said



seat piece means is pivotally raised to a predetermined height;

said block means comprising a substantially triangular member which is pivotable about a point adjacent an apex of said back means, and is freely rotatable such that its base portion normaly faces downwardly under the influence of gravitational force when the frame is in either its sofa or bed position; and

a notch means in the forward cross bar of said seat piece means, said notch being adapted to interlock with a portion of said frame means to secure said furniture frame in the sofa position.

4,875,245

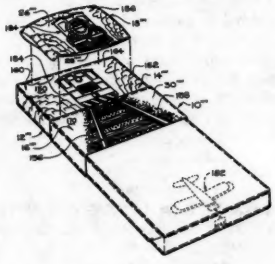
BED CLOTHES

Richard A. Isola, Bloomfield Hills, Mich., assignor to Habitation, Bloomfield Hills, Mich.

Continuation of Ser. No. 524,116, Aug. 18, 1983, abandoned, which is a continuation of Ser. No. 218,064, Dec. 19, 1980, abandoned. This application Jul. 25, 1988, Ser. No. 223,685

Int. Cl.[4] A47G *9/02*

U.S. Cl. 5—482 **29 Claims**



1. In combination with a bed or similar type of apparatus having a covering element disposed thereupon and a head portion at one end thereof and a foot portion at the opposite end thereof, and adapted to have a pillow-like device placed at the head portion thereof,

a bed sheet adapted to overlie said bed and be arranged at least in part beneath said covering element and comprising first and second areas adapted to be selectively alternately oriented adjacent the head and foot portions of the bed,

said sheet having said first area printed with a first graphic illustration depicting a first subject matter and a second area printed with a second graphic illustration depicting a second subject matter, different from the first subject matter, whereby when said sheet is disposed on the bed with said second area adjacent said head portion and the covering element disposed in overlying relation with respect to said first area so that only said second area of said bed sheet is exposed, the visual impression is given that said bed sheet depicts solely said second subject matter, and when said bed sheet is disposed on the bed with said first area adjacent said head portion and the covering element disposed in overlying relation with respect to said second area so that only said first area of said bed sheet is exposed, the visual impression is given that said bed sheet depicts solely said first subject matter, and

a pillowcase element having first and second sides and adapted to receive the pillow-like device therewithin, said first side having means depicting a subject matter which cooperates with said first subject matter depicted on said first area of said bed sheet, and said second side having means depicting a second different subject matter which cooperates with said second subject matter depicted on said second area of said bed sheet.

4,875,246

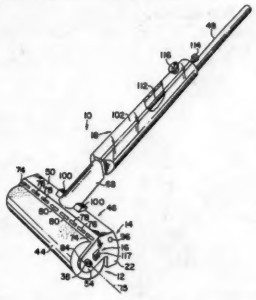
SURFACE TREATING DEVICE

Francis W. MacGregor, Simsbury, Conn., assignor to Quad Research, Inc., Avon, Conn.

Filed Jul. 22, 1988, Ser. No. 223,221

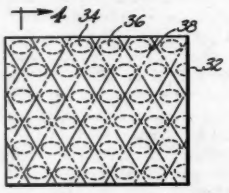
Int. Cl.[4] A47L *11/29*

U.S. Cl. 15—98 **21 Claims**



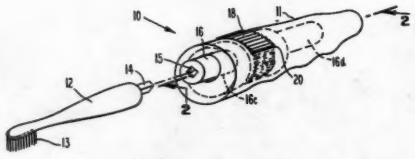
1. A power operated surface treating device comprising a handle assembly, a generally cylindrical roller, means supporting said roller on said handle assembly for rotation about its axis and relative to said handle assembly, drive means for rotating said roller about said axis and relative to said handle assembly and including a motor supported within said roller and having a fixed part and a rotatable part, one of said parts comprising said fixed part and said rotatable part being connected to said handle assembly and the other of said parts being connected to said roller, a power supply source wholly contained within said roller, and switching means on said surface treating device for connecting said power supply source to said motor to energize said motor.

4,875,247
DISPOSABLE TOOTH CLEANING & POLISHING APPARATUS
Skip Berg, P. O. Drawer 725, Venice, Fla. 34282
Continuation of Ser. No. 83,028, Aug. 7, 1987, abandoned. This application Jun. 20, 1989, Ser. No. 371,689
Int. Cl.[4] A61C *17/00*
U.S. Cl. 15—104.94 13 Claims



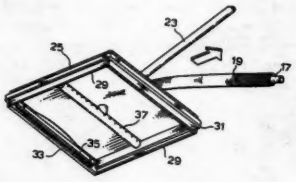
1. A disposable tooth cleaning and polishing product for manually cleaning tooth surfaces and for stimulating gums comprising:
a single, unfolded sheet of very thin, flexible textured material having a first surface and a second surface and being substantially insoluble in water and oral cavity juices;
said first surface textured to remove plaque, food residue, and oral cavity acids from tooth surfaces by manually rubbing said sheet material with finger pressure against the tooth surfaces;
said second surface textured to remain in non-sliding friction contact against a user's fingertip.

4,875,248
ADJUSTABLE TOOTHBRUSH
Steven Kent, Stockport, England, assignor to Colgate-Palmolive Company, Piscataway, N.J.
Filed Mar. 23, 1988, Ser. No. 172,033
Int. Cl.[4] A46B *7/02*; B25G *1/06*
U.S. Cl. 15—143 R 6 Claims



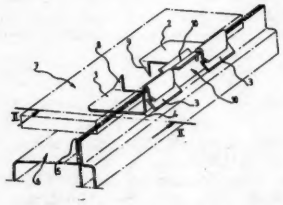
1. An adjustable toothbrush comprising a handle, a shaft mounted for rotation within said handle and having a portion extending beyond the handle terminating in a brush head having bristles thereon, said handle having a chamber in the interior thereof, said handle having an opening to its outer surface and communicating with said chamber, said shaft passing through said chamber, deformable material in sid chamber surrounding a portion of said shaft, said deformable material having a ring gear thereon extending to the outer surface of said deformable material, said ring gear being accessible through said opening, gear teeth fixed to said handle within said chamber for meshing engagement with said ring gear, said ring gear being engageable with said gear teeth upon application of pressure on said ring gear through said opening, said ring gear being engageable with said gear teeth to prevent rotation of said shaft.

4,875,249
CARPET REPAIR STEAM SYSTEM
David S. Collier, 3985 Garnetwood Chase, Mississauga, Ontario, Canada (L4W 2H3)
Filed May 11, 1988, Ser. No. 192,703
Int. Cl.[4] B08B *3/00*
U.S. Cl. 15—398 12 Claims



1. A steam system for repairing bent carpet fibres, said steam system comprising a steam generator and an application tool having a head with a steam chamber fed by said steam generator, said steam chamber being defined by a downwardly opening shroud supporting said tool and trapping the steam at the carpet fibres immediately beneath said shroud to provide an oven-like effect for resetting of the carpet fibres from a bent to an unbent position, said head of said application tool further including fibre lifting means for lifting the fibres to the unbent position after having been relaxed by the steam.

4,875,250
CLAMP FOR FASTENING A CARPET ON A FLOOR
René Chaintreuil, Audincourt, France, assignor to Automobiles Peugeot and Automobiles Citroen, both of Paris, France
Filed Oct. 18, 1988, Ser. No. 259,512
Claims priority, application France, Oct. 20, 1987, 87 14460
Int. Cl.[4] A47G *27/04*
U.S. Cl. 16—4 8 Claims



1. A clamp for fastening an element such as a carpet or the like onto a surface such as a vehicle floor, comprising a first portion folded back on itself and adapted to be clipped onto an edge forming a flange and a second portion, connected to the first portion, adapted to retain said element onto said surface, wherein the improvement comprises said second portion being connected at right angles to the first portion and said second portion including at least two members spaced or offset from each other in both a first plane and in a second plane substantially perpendicular to said first plane and said members being connected to each other through a bridging portion.

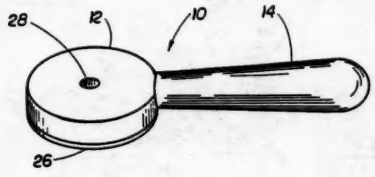
4,875,251
TOILET SEAT HANDLE OF UNITARY CONSTRUCTION
James T. Hazard, 311 Fairmeade Rd., Louisville, Ky. 40207
Filed Dec. 22, 1988, Ser. No. 288,480
Int. Cl.[4] A47K *13/10*
U.S. Cl. 16—111 R 8 Claims

1. A toilet seat handle device for attachment to a toilet seat as an aid to raising and lowering the toilet seat comprising:
a cylindrical base portion with upper and lower planar sur-

faces configured so as to fit with said upper planar surface against the bottom side of the toilet seat;

means for attaching the base portion to the bottom side of the toilet seat; and,

a cylindrical handle portion unitarily constructed with said base portion so as to have a first end affixed to a circumferential surface of said base portion, and a second end ex-



tending radially outward from said base portion, such that when the base portion is attached to the toilet seat, the handle portion extends outwardly beyond the outside periphery of the toilet seat, said handle portion having a diameter at its first end substantially equal to a distance between the two planar surfaces of said base portion, said handle portion including a coating of material that glows so that the handle portion is visible in the dark.

4,875,252

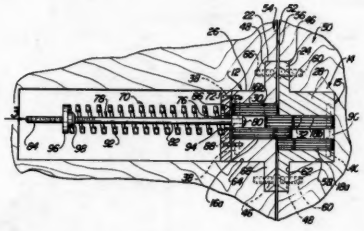
SELF-CLOSING INVISIBLE HINGE WITH SELECTIVELY VARIABLE CLOSING FORCE

Donald R. Falconer, Swanton, Ohio, and James C. Sneddon, Hillsdale, Mich., assignors to Universal Industrial Products., a Division of Core Industries, Inc., Pioneer, Ohio

Filed Jul. 5, 1988, Ser. No. 215,240

Int. Cl.[4] E05D *7/00*; E05F *1/12*

U.S. Cl. 16—288 **11 Claims**



3. In a door connected to an associated wall by a hinge structure for swinging movement relative to the wall and adapted to be moved between closed and open positions, the invention comprising:

a self-closing invisible hinge for supporting the door to the wall for swinging movement between the closed and open positions and for urging and returning the door to its closed position from its open position,

said self-closing invisible hinge comprising a pair of hinge bodies,

each of said hinge bodies having a mounting plate and an extension portion extending inwardly from said mounting plate,

each said hinge bodies having an opening extending therethrough, said opening having upper and lower surfaces and a side surface, a pair of upper and lower guide slots located in said upper and lower surfaces,

link means connected to said hinge bodies for permitting swinging movement of said hinge bodies relative to each other and hence swinging movement of the door relative to the wall between its closed and open positions,

fastening means operatively connected with said mounting plates for connecting said hinge bodies to the door and the wall,

said link means comprising a first pair of link members and a second pair of link members, each of said link members having a generally triangular shape defined by leg portions extending divergingly fromt he apexes of said triangular shape,

a pivot pin pivotally connecting said first and second pairs of link members together generally at their apexes with said first pair of link members being alternately interleaved with said second pair of link members, one of the ends of said first pair of link members being located in said opening in one of said hinge bodies and being pivotally held there by a first pivot pin,

one of the ends of said second pair of link members being located in said opening in the other of said hinge bodies and being pivotally held there by a second pivot pin,

the opposite ends of said first pair of link members being connected together by a first guide pin having opposite ends located in said upper and lower guide slots in one of said hinge members, said first guide pin having an enlarged intermediate portion located between said first and second link members at said opposite ends of said first pair of link members,

the opposite ends of said second pair of link members being connected together by a second guide pin having opposite ends located in said upper and lower guide slots in the other of said hinge members,

a coil spring member of generally uniform diameter and having one end operative against said extension body portion of said one of said hinge bodies,

an adjustment rod having an elongated shank portion extending through a first opening through said enlarged intermediate portion and extending through said opening in said one of said hinge bodies and extending generally concentrically with said coil spring, said adjustment rod having an enlarged head portion at one end larger than said first opening and adapted to engage said intermediate portion,

said shank being threaded at its opposite end portion,

a retainer member located at the opposite end of said coil spring and adapted to engage said opposite end, said retainer member having a threaded bore adapted to threadably engage said threaded end portion of said shank,

said spring member adapted to provide a bias between said first and second link members and said hinge bodies to provide a bias urging said hinge bodies to the closed position,

said enlarged head having an irregular surface adapted to be engageable whereby an operator can manually thread said shank more or less into said threaded bore of said retainer member, whereby the bias of said spring member relative to said first and second pairs of link members and said hinge bodies can be selectively varied by the operator,

said enlarged head being accessible to the operator when said hinge bodies are in the open position whereby the selective adjustment can be made externally of the door and wall.

4,875,253

PROCESS FOR STUNNING LIVESTOCK

Elbert Lambooy, Veenendaal, Netherlands, assignor to Stichting Instituut Voor Veeteeltkundig Onderzoek "Schoonoord", Am Zeist, Netherlands

Filed Sep. 2, 1988, Ser. No. 240,755

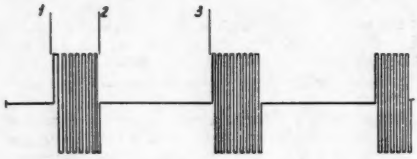
Claims priority, application Netherlands, Sep. 7, 1987, 8702114

Int. Cl.[4] A22B *3/00*

U.S. Cl. 17—1 E **8 Claims**

1. In a process for stunning livestock, in particular pigs,

comprising administering to the animal to be stunned, through electrodes, a brief low frequency electrical current surge the improvement comprising:



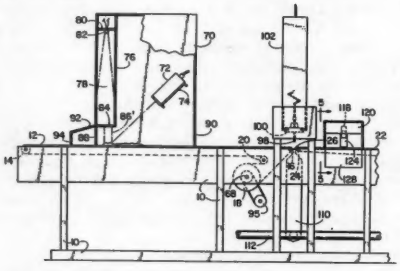
administering a stunning current surge prior to sticking the animal, followed by an intermittent current surge, the frequency of which is at least a thousand times the frequency of the stunning current surge.

4,875,254

METHOD AND APPARATUS FOR AUTOMATICALLY CUTTING FOOD PRODUCTS TO PREDETERMINED WEIGHT OR SHAPE

Norman A. Rudy, Renton, and James S. Tomlin, Seattle, both of Wash., assignors to Design Systems, Inc., Seattle, Wash.

Filed Mar. 22, 1988, Ser. No. 171,774
Int. Cl.[4] A22C *25/14*
U.S. Cl. 17—61 **20 Claims**



1. Apparatus for cutting food and like products to desired reduced sizes, comprising:
(a) a frame,
(b) elongated conveyor means on the frame for moving the product from an infeed end to an outfeed end,
(c) means on the frame for determining the dimensions of product as it moves on the conveyor means, and
(d) at least one line-type cutter on the frame movable transversely of the conveyor means and having a cutting edge disposed on a line extending through the working stretch of the conveyor means for cutting products moving on the conveyor means along lines predetermined to reduce the product to desired size.

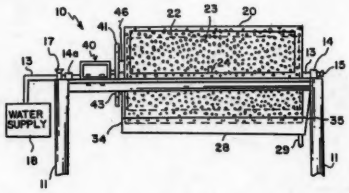
4,875,255

FISH SCALING APPARATUS AND PROCESS

George W. Kent, Jr., 3522 Hampton Hwy., Hampton, Va. 23666

Filed Nov. 30, 1988, Ser. No. 277,692
Int. Cl.[4] A22C *25/02*
U.S. Cl. 17—64 **10 Claims**

1. A fish scaling apparatus comprising in combination:
(a) a support stand,
(b) an inner and an outer hollow elongated drum disposed in spaced concentric relationship and supported by said support stand,
(c) an access door in said outer drum for loading and unloading a quantity of fish in the space between said inner and said outer drum,
(d) an axle extending along the common axis through said drums,
(e) means for rotating said pair of drums about said axle,
(f) a plurality of dimpled perforations provided through the sidewall of each said inner and said outer drum,
(g) said dimpled perforations on said inner drum being directed toward the exterior surface thereof and provided with rough edge surfaces directed toward the interior surface of said outer drum,



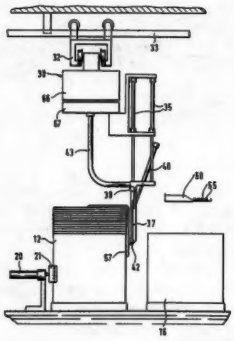
(h) said dimpled perforations on said outer drum being directed toward the interior surface thereof and provided with rough edge surfaces directed toward the exterior surface of said inner drum, and
(i) means connecting said inner and said outer drums whereby said inner and said outer drums rotate as a unit, whereby, as said drums are rotated the fish disposed between said drums move against the rough edge surfaces on both said drums and are scaled thereby.

4,875,256

METHOD AND APPARATUS FOR REPLACING EMPTY SLIVER CANS WITH FULL SLIVER CANS IN A DRAW FRAME

Siegfried Gunkinger, Heiningen, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 224,998
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725265
Int. Cl.[4] D04H *11/00*
U.S. Cl. 19—159 A **27 Claims**



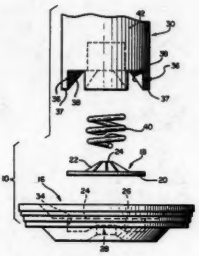
1. A method for replacing empty sliver cans with full sliver cans in a draw frame in which a plurality of slivers are fed from cans for processing in the draw frame, said method comprising positioning a full sliver can in readiness for replacing a can being emptied by the draw frame, and with an end of sliver exposed from the full can, positioning a movable carriage at the full can, grapsing the exposed end of sliver with a gripper carried on the carriage and placing the grasped sliver end into the draw frame by manipulating the gripper, and shifting the full can into sliver feeding position and the empty can out of sliver feeding position.

4,875,257

TACK BUTTON AND METHOD OF MAKING THE SAME

Robert E. Anderson, Roselle, and Michael L. Baritz, Highland Park, both of Ill., assignors to Handy Button Machine Company, Melrose Park, Ill.

Filed Jun. 8, 1988, Ser. No. 204,169
Int. Cl.[4] A44B 1/18
U.S. Cl. 24—90 B 10 Claims



1. A tack retaining back support structure for securement to a front button shell of a decorative tack button, comprising:

(1) a plastic support member integrally molded and including an annular body having an open central recess and a bottom wall formed below the recess and having a through-aperture opening into said recess, said body further having an interior wall extending inwardly from said bottom wall toward said recess; and

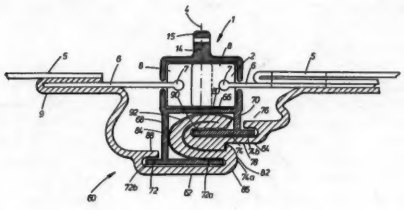
(2) a tack retainer member inserted into said recess and supported on said button wall, and having a retainer aperture, aligned with said through aperture for receiving a tack shank therethrough and for peripherally gripping and retaining said shank, said interior wall having at least a portion of the plastic thereof deformed radially inwardly against said retainer member to clamp said retainer member against said bottom wall.

4,875,258

GAS- AND LIQUID-TIGHT FASTENER

Hans J. Goedecke, Gabriel-von-Seidl-Strasse 2a, D-8022 Gruenwald, Fed. Rep. of Germany

Filed Jan. 7, 1988, Ser. No. 141,624
Claims priority, application Fed. Rep. of Germany, Jan. 8, 1987, 3700427
Int. Cl.[4] A44B 19/32
U.S. Cl. 24—389 51 Claims



1. A gas-tight and liquid-tight fastener for connecting two contiguous edge portions of a material wall of an object to be sealed, said material wall including first and second material layers fixedly connected to each other, the fastener comprising:

a zipper for joining the first layer of material;

a sealing slide fastener for joining the second layer of material;

said zipper and said sealing slide fastener being formed as a unitary slider member; and

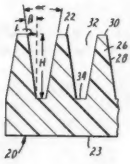
means for actuating said unitary slider member, wherein said means for actuating simultaneously opens said zipper and said sealing slide fastener when actuated in a first direction and simultaneously closes said zipper and said sealing slide fastener when actuated in a second direction, thereby simultaneously separating the two continguous edge portions of the sealing wall or joining them into tight locking engagement with each other, respectively.

4,875,259

INTERMESHABLE ARTICLE

Roger H. Appeldorn, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 904,358, Sep. 8, 1986, abandoned. This application Mar. 24, 1988, Ser. No. 172,631
Int. Cl.[4] A44B 1/00
U.S. Cl. 24—576 23 Claims



1. An intermeshable article, comprising

a member having at least one major surface at least a portion of that surface being a structured surface;

said structure surface including a plurality of solid tapered elements, each element having at least one side inclined relative to a common plane at an angle sufficient to form a taper such that each element may mesh with at least one corresponding element when brought into contact with said corresponding element and adhere thereto at least partially because of the frictional force of adherence of said contacting sides and wherein the tangent of the half angle of the tapered sides of the elements is no greater than the coefficient of friction of the material of the contacting surfaces.

4,875,260

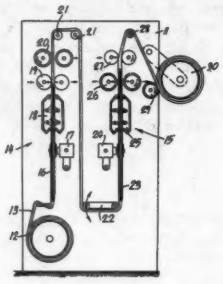
APPARATUS FOR THE PRESETTABLE CALENDERING OF TUBULAR KNITTED FABRIC

Gino D. Vecchia, Santorso, Italy, assignor to Sperotto Rimar S.p.A., Zane, Italy

Filed Jun. 17, 1987, Ser. No. 63,172
Claims priority, application Italy, Jun. 17, 1986, 20812 A/86; Jun. 17, 1986, 22296 B/86; Nov. 28, 1986, 23886 B/86
Int. Cl.[4] D06C 5/00, 25/00
U.S. Cl. 26—81 13 Claims

1. Apparatus for calendering tubular knitted fabric comprising a support frame, means for feeding tubular knitted fabric in vertically upwards direction along said frame, expander means on said frame for stretching the tubular knitted fabric as the fabric is advanced along said frame, a steaming chamber on said frame above the expander means through which the stretched tubular fabric is fed, a first pair of calendering cylinders on said frame downstream of the steaming chamber for calendering the fabric after the fabric has left the steaming chamber, a second pair of calendering cylinders downstream of the first pair and through which the fabric is advanced, one of said pairs of calendering cylinders having polished surfaces

and the other pair of calendering cylinders having a coating of textile material thereon for imparting different finishing effects



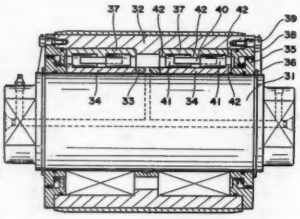
to the tubular knitted fabric, and means for selectively engaging the pairs of rollers with the advancing fabric.

4,875,261

BACK-UP ROLL IN A ROLLING MILL

Masahiro Nishida, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Oct. 17, 1988, Ser. No. 258,858
Claims priority, application Japan, Oct. 28, 1987, 62-165228
Int. Cl.[4] B21B *27/00*
U.S. Cl. 29—116.1 **8 Claims**



1. A back-up roll in a rolling mill comprising:
a roll shaft of the back-up roll of the rolling mill;
an outer casing disposed outside the roll shaft;
multiple cylindrical rollers fit circumferentially between the roll shaft and the outer casing; and
a tapered roller bearing which is provided between the roll shaft and outer casing and juxtaposed to said cylindrical rollers, and which receives a thrust load acting on said cylindrical rollers,
wherein said tapered roller bearing is composed of an inner ring fit to an outside of said roll shaft, an outer ring fixed to an inside of said outer casing and in contact with ends of said cylindrical rollers, and multiple tapered rollers fit between the inner and outer rings.

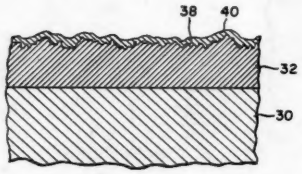
4,875,262

PROCESS FOR MANUFACTURING A GRAIN CHILL ROLLER

Gilbert F. DeGrave, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 23, 1988, Ser. No. 248,469
Int. Cl.[4] C25D *5/48, 7/00*
U.S. Cl. 29—121.8 **6 Claims**

1. A manufacturing process for preparing a surface of a roller for use in a thermoplastic embossing process, the process comprising the steps of:
electroplating a layer of copper onto the surface of a roller,
abrasively blasting the surface of the copper layer with glass beads to create a surface texture with hemishperical down features having a substantially uniform depth,
abrasively blasting the copper surface with particles of silicon dioxide to modify the pattern formed during the step of blasting with glass beads and create a textured surface, and



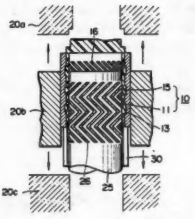
bright nickel electroplating the blasted surface to a depth that results in a leveling of the down pattern of the surface without eliminating the down pattern in order to avoid a high gloss surface in the surface formed during the thermoplastic embossing process.

4,875,263

METHOD OF MANUFACTURING A DYNAMIC PRESSURE TYPE SLIDE BEARING

Kyozaburo Furumura, Ninomiya, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 15,785, Feb. 17, 1987, abandoned. This application Jul. 5, 1988, Ser. No. 215,031
Int. Cl.[4] B21D *53/10*
U.S. Cl. 29—149.5 S **14 Claims**



1. A method of manufacturing a dynamic pressure type slide bearing, the bearing comprising an outer cylindrical member and an inner cylindrical member having been formed on the inner peripheral face thereof with a plurality of grooves for generating dynamic pressure and fixedly joined to the inner peripheral face of the outer cylindrical member, the method comprises the steps of:
inserting the outer cylindrical member, having previously been applied with a joining means, into an outer mould,
injecting melted moulding material of synthetic resin into an annular gap defined between an inner mould and the outer cylindrical member, the outer cylindrical member having been inserted into the outer mould, the outer peripheral face of the inner mould having a plurality of projecting ridges corresponding to the grooves for generating dynamic pressure;
solidifying the injected moulding material to form the inner cylindrical member, the inner cylindrical member being fixedly joined to the outer cylindrical member during the solidifying, the inner cylindrical member expanding away from the inner mould during the solidifying, the inner cylindrical member and the outer cylindrical member constituting a composite slide bearing having an integrally joined laminated construction; and
removing the composite slide bearing from both the outer

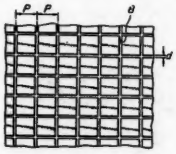
mould and inner mould by axially moving the composite slide bearing away from the inner mould and the outer mould.

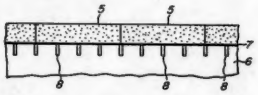
4,875,264

METHOD FOR PRODUCING DIES FOR EXTRUDING HONEYCOMB STRUCTURES

Satoru Inoue, Aichi, and Shoji Futamura, Kawasaki, both of Japan, assignors to NGK Insulators, Ltd. and Hoden Seimitsu, both of Nagoya, Japan

Division of Ser. No. 84,027, Aug. 11, 1987, Pat. No. 4,830,598. This application Feb. 28, 1989, Ser. No. 316,641
Claims priority, application Japan, Aug. 14, 1986, 61-190744
Int. Cl.[4] B23P *9/00*
U.S. Cl. 29—163.6 **8 Claims**





1. A method of producing honeycomb structural forming dies comprising:

providing a steel base body having a first coefficient of thermal expansion, a first surface and a second surface;

machining said body to form a desired shape;

forming a matrix of preliminary slits in said first surface and perpendicular thereto such that said matrix substantially corresponds to that of a honeycomb structure subsequently formed from said die;

providing a plurality of wear-resistant super hard alloy plates having a second coefficient of thermal expansion which is different from said first coefficient of thermal expansion, said plates having a given size and four side edge faces;

placing a bonding layer on said first surface of said steel die base body;

placing said plates on said bonding layer;

bonding said plates to said steel die base body, via the bonding layer, to form a bonded article, said bonding being performed by a high temperature welding technique, whereby a plurality of gaps are formed between said super hard alloy plates due to the different in coefficients of thermal expansion between said steel die base body and said plates;

cooling the bonded article to room temperature, whereby a portion of said preliminary slits are dimensionally altered so as to facilitate an expansion and contraction of said bonded article due to the different coefficients of thermal expansion between said steel die base body and said wear-resistant super hard alloy plates;

forming a matrix of forming channels in said bonded article perpendicular to said first surface, said matrix of forming channels being formed through said wear-resistant super hard alloy plates and said bonding layer, into the matrix of said preliminary slits in said steel die base body to form a final matrix in said bonded article; and

forming opening holes in said second surface of said steel die base body and perpendicular thereto to result in a honeycomb structure forming die, said opening holes communicating with said forming channels of said final matrix;

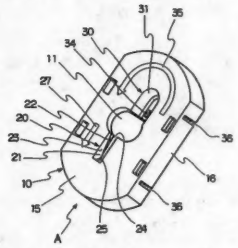
whereby said honeycomb structure forming die is substantially free of any internal strain due to the different coefficients of thermal expansion between the steel die base body and the ,wear-resistant super hard alloy plates.

4,875,265

INJECTION NEEDLE-DETACHING DEVICE

Toshiki Yoshida, Osaka, Japan, assignor to Nissho Corporation, Osaka, Japan

Filed Nov. 4, 1988, Ser. No. 267,480
Claims priority, application Japan, Dec. 14, 1987, 62-189702
Int. Cl.[4] B65D *25/00*
U.S. Cl. 29—240 **4 Claims**



1. A device for detaching an injection needle from a syringe comprising:

a plate-like member,

a first opening provided in the plate-like member for inserting an injection needle attached to a syringe,

a first needle-detaching means for detaching a slip type needle, and

a second needle-detaching means for detaching a screw type needle,

said first opening having a size larger than the largest part of said needle,

said first needle-detaching means comprising a second opening extending laterally from said first opening, and a sliding portion provided on each of both sides of said second opening,

said second opening having a width larger than the diameter of the nozzle of said syringe and smaller than the diameter of the hub of said needle,

each of said sliding portion having a side wall defining said second opening,

each of said side walls having, at the entrance of the second opening from said first opening, a thickness smaller than a distance between the root of the nozzle of said syringe and the bottom end of the hub of said needle when the needle is being attached to said syringe, each of said side walls being made gradually thicker toward the closed end of said second opening, the maximum thickness of each of said side walls being larger than said distance,

said second needle-detaching means comprising a third opening extending laterally from said first opening,

said third opening having a portion having such a size that the hub of said needle is capable of being inserted thereinto, said portion being provided with a projection for preventing the hub of said needle from turning when the syringe is turned.

4,875,266

RELEASABLE HIGH TORQUE FASTENER

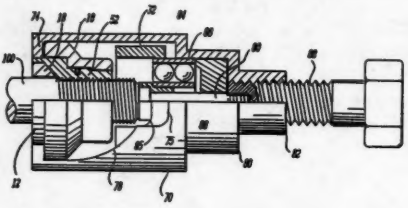
Ronald W. Batten, 5618 White Ct., Torrance, Calif. 90503

Continuation-in-part of Ser. No. 802,425, Nov. 27, 1985, Pat. No. 4,737,059. This application Jul. 13, 1987, Ser. No. 72,438
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—263 **12 Claims**

1. A releasable multiple part fastener which comprises:

(a) a first part comprising an internally threaded slottede body having:

(1) a base and at least one reduced diameter neck of a lesser diameter;
(2) at least one axial slot extending axially through the body of said fastener and at least one additional axial slot extending substantially, but not entirely, through the body of said fastener, subdividing said body into at least two segments and
(3) at least one, non-circular surfaced, torque transmitting external wall on each of said segments and



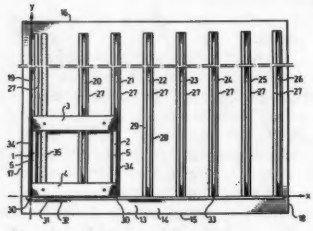
b. a second part comprising a retainer ring surrounding said slotted body and having:
(1) a first annular bottom recess in open communication with a second annular of reduced diameter recess of reduced diameter to receive said slotted body; and
(2) a torque transmitting section comprising an internal wall with a non-circular surface of a contour to mate with the non-circular surfaced, torque transmitting external waall of each said fastener segment and in hoop stress bearing relationship thereto.

4,875,267

MEANS FOR ASSEMBLING BOARDS

Olle Berg, Döderman, Järna, Sweden

PCT No. PCT/SE86/00584, § 371 Date Jun. 27, 1988, § 102(e) Date Jun. 27, 1988, PCT Pub. No. WO87/04286, PCT Pub. Date Jul. 16, 1987
PCT Filed Dec. 22, 1986, Ser. No. 213,613
Claims priority, application Sweden, Dec. 27, 1985, 8506135-6
Int. Cl.[4] B23P *11/00*
U.S. Cl. 29—281.3 **9 Claims**



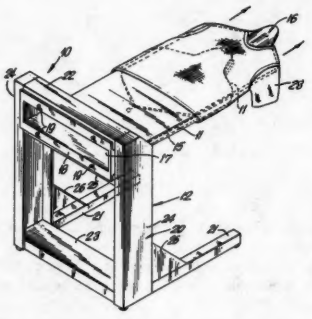
1. A means for assembling rectangular display boards of varying, predetermined sizes, and of the type comprising two sign element holders (1, 2) determining the height of the display board, one or more back elements (3, 4) determining the width of the display board and arranged to be rigidly connected to flat outer surfaces (5) of the sign element holders (1, 2), and sign elements the end portions of which being arranged to be inserted into corresponding grooves in the sign element holders, said holders having a shank (8) with a foot portion (9) protruding from the shank, said assembling means comprising: a static fixture comprising a plate (14) which is larger than the largest predetermined size of the display boards to be assembled, and which has means defining a plurality of parallel grooves (19 to 26) to receive the foot portions (9) of the sign element holders (1, 2) without friction or play, the grooves (19 to 26) being arranged in a coordinate system with a first groove (19) located on the y-axis and the remaining grooves (20 to 26) being arranged with predetermined distances from the first groove with increasing x-values corresponding to predetermined widths of display boards, and the grooves (19 to 26) starting from the x-axis with which one end of a sign element holder (1, 2) placed in a groove is to coincide during assembly, said grooves (19 to 26) being sufficiently long to receive sign element holders (1, 2) of varying lengths corresponding to predetermined heights of display boards.

4,875,268

APPARATUS FOR MOUNTING ARTICLES OF CLOTHING TO A PRINTING PALLET

Sandor Szarka, Franklin Lakes, N.J., assignor to Precision Screen Machines, Inc., Hawthorne, N.J.

Filed Dec. 12, 1988, Ser. No. 283,466
Int. Cl.[4] B23Q *1/02*
U.S. Cl. 29—283 **6 Claims**



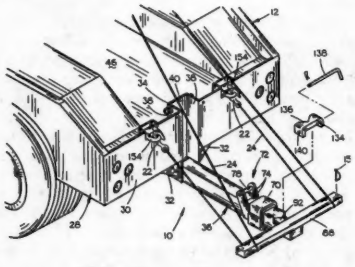
1. An apparatus for mounting articles of clothing onto a printing pallet comprising: a pallet sleeve adapted to receive said articles to be mounted, said sleeve being provided with means for engaging said pallet so as to guide said pallet into the interior of said sleeve; and the means for supporting said sleeve in a position which facilitates the mounting of said articles onto said sleeve and the transfer of said articles from said sleeve to said pallet by removing said pallet from the interior of said sleeve.

4,875,269

UNDERLIFT ATTACHMENT FOR TOW TRUCKS

Larry L. Crist, West Highway 33, Crete, Nebr. 68333

Filed May 10, 1988, Ser. No. 192,153
Int. Cl.[4] B60P *3/12*
U.S. Cl. 29—401.1 **2 Claims**



1. A method for attaching a vehicle-towing underlift to a tow truck, comprising the steps of: providing a vehicle towing underlift attachment, including:
a generally vertically-oriented channel member having a

pair of side walls and a rearward wall, and having upper and lower ends;

a boom arm pivotally mounted at one end to the lower end of said channel member, and mounted to pivot between a storage position, wherein said boom arm is received between the side walls of the channel member and abutting the rearward wall of the channel member such that said boom arm is received within said channel member flush with the edges of the side walls, and a pivotable operable position projecting outwardly from said channel member;

said boom arm including a tubular housing member, an operable extendable arm telescoping therefrom, and means connected between said tubular housing member and said extendable arm for extending and retracting said extendable arm with respect to said tubular housing member;

said extendable arm of said boom arm further including a cross bar member pivotally and removably mounted on said extendable arm, for movement about an axis generally perpendicular to longitudinal axis of said extendable arm;

and bracket means selectively, removably connected to each end of said cross bar for selective connection to a vehicle to be towed;

providing a tow truck, having: a boom connected to the tow truck housing; an operable winch mounted on said housing; a hook member attached to a tow cable journaled over said boom and connected to said winch; and a generally flat, vertical tailboard;

cutting a vertical slot in the tailboard and housing of said tow truck to a depth equal to the depth of said pocket of said underlift attachment;

affixing said pocket portion in said slot with the side walls flush with the tailboard and the upper end flush with the upper edge of the tailboard;

mounting said electrohydraulic pump to said tow housing; and

electrically connecting said electrohydraulic pump and said switch means to the battery of the tow truck.

4,875,270

METHOD OF SECURING PARTS TO A HOLLOW MEMBER

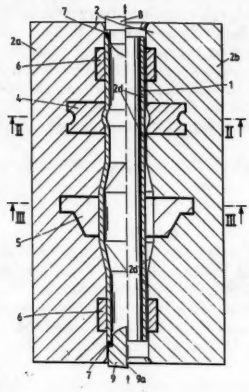
Herbert Krips, Bochum, and Miroslan Podhorsky, Ratingen, both of Fed. Rep. of Germany, assignors to Balcke-Dürr Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 82,037, Aug. 5, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 325,068

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1986, 3627258; European Pat. Off., Jan. 27, 1987, 87101122.7

Int. Cl.[4] B23P *17/00, 11/02;* **B21D** *39/00*

U.S. Cl. 29—421.1 **3 Claims**



1. In a method of securing one or more parts, each of which is provided with an opening and at least one of which is a cam or other drive element able to transmit torque, to a hollow member, whereby in the starting state, the inner diameter of the opening of said parts is greater than the outer diameter of the surface provided on said hollow member for securing said part, and whereby said parts are placed supported via support surfaces of a matrix in the prescribed position along segments on said hollow member prior to the securing operation, the improvement therewith comprising in sequence the steps of:

prior to placing said parts on said hollow member, producing a temperature difference by heating said parts and/or by cooling said hollow member;

placing said parts subjected to said temperature differences on said hollow member; and supporting the outer surfaces of said parts as well as the regions of said hollow member disposed between said parts via the support surfaces of said matrix; and

securing each of said parts to said hollow member by widening and expanding the securing regions of said hollow member, and followed by a subsequent shrink fitting of said parts onto said hollow member as a consequence of allowing temperature equalization to occur.

4,875,271

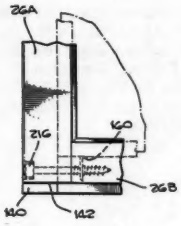
METHOD FOR PRODUCING THERMOPLASTIC FRAMES FOR FENESTRATION

John H. Coller, Whittier, and Donald N. Littleton, Riverside, both of Calif., assignors to D. G. Shelter Products Co., City of Industry, Calif.

Filed Jul. 27, 1988, Ser. No. 225,057

Int. Cl.[4] B23P *11/00, 19/04*

U.S. Cl. 29—432 **8 Claims**



1. In a method of preparing a thermoplastic material for use in fenestration including the steps of:

cutting elongated extruded stock of thermoplastic material to approximate length;

placing cut stock pieces on a conveyor so that the longitudinal axes of the cut stock pieces are transverse to the direction of travel of the conveyor;

providing an oven through which the conveyor transports said stock pieces;

heating the stock to a selected temperature uniformly throughout its cross-sectional thickness to provide softness to the thermoplastic material;

drilling a hole at a selected location in said stock;

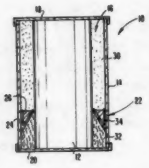
and driving a fastener member having a hole into said stock in selected relation to said stock hole by forcing said fastener member into said softened thermoplastic material to a pre-selected depth so that the fastener hole is coaxial with said stock hole.

4,875,272

METHOD OF MAKING SPACED-WALL APPLIANCE WITH A SEALING AND INSULATING DEVICE BETWEEN SAID WALLS

Thomas E. Nelson, 2407 Gretten La., Anchorage, Ky. 40223

Filed Jul. 7, 1988, Ser. No. 216,384
Int. Cl.[4] B23P *11/02, 19/04;* B21D *39/00*
U.S. Cl. 29—451 11 Claims



1. A method of assembling an appliance having a first wall surface spaced from a second wall surface defining a space therebetween comprising the steps of:

forming an insulation and sealing device comprising means defining an open topped trough having side walls converging in a downwardly direction away from the open top fabricated of a flexible material, the width of the trough across the open top being at least approximately equal to the width of the space between the first and second wall, and a resilient insulating material in the open topped trough exposed at the open top of the trough;

positioning the insulation and sealing device in contact with the first wall with the converging side walls of the insulation and sealing device directed along the first wall; and,

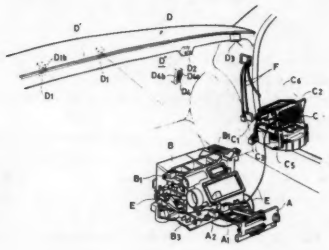
moving the first wall in the direction of the taper of the converging side walls of the insulation and sealing device to a position overlaying the second wall in spaced apart juxtaposition with the second wall such that the insulation and sealing device is in contact with the second wall creating a seal across the space.

4,875,273

METHOD FOR ASSEMBLING ASSOCIATED COMPONENTS

Yasuhiro Yamamoto, Sayama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 291,030
Claims priority, application Japan, Dec. 29, 1987, 62-335207; Dec. 29, 1987, 62-335209
Int. Cl.[4] B23Q *3/00*
U.S. Cl. 29—467 2 Claims



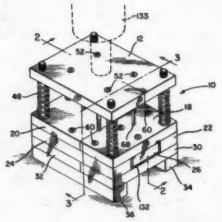
1. A method for assembling a plurality of associated components which are associated with one another through wiring materials to an article comprising setting the associated components on a common set jig to have a predetermined mutual positional relationship with one another; connection wiring between said components by the wiring materials; grasping the components on a common assembling robot while they are kept held in said predetermined mutual positional relationship, said common assembling robot comprising a robot arm and a plurality of assembling jigs mounted on the arm to hold these associated components; and moving and operating assembling robot to assemble the components to the article at predetermined fixing spots thereof.

4,875,274

METHOD OF CUTTING METAL STUD AND BENDING AND SECURING SAME TO FORM ANGEL MEMBER

Larry L. Foster, P.O. Box 1283, Modesto, Calif. 95353

Division of Ser. No. 30,237, May 19, 1988, Pat. No. 4,787,283.
This application May 19, 1988, Ser. No. 195,808
Int. Cl.[4] B23P *11/00*
U.S. Cl. 29—525.1 8 Claims



1. The method of forming an angle framing member from an elongated channel-shaped stud including generally parallel first and second longitudinal side flanges interconnected by a longitudinal web extending therebetween and from those opposite longitudinal margins said flanges are supported, said method including:

A. Cutting away a predetermined length of said first side flange to form an opening therethrough extending longitudinally of said stud and having opposite ends and a longitudinal mid-point spaced apart along the longitudinal extent of said stud;

B. Making a narrow transverse cut through said web extending from the longitudinal margin of said web corresponding to said first side flange and to a point immediately adjacent said second side flange and with the end of said transverse cut adjacent said second side flange spaced along said stud from said longitudinal mid-point of said opening;

C. Relatively angularly displacing the portions of said stud on opposite sides of said transverse cut about an axis normal to said web and substantially contained within said second side flange to positions with the portions of said web, disposed on opposite sides of said transverse cut, overlap engaged with each other and the portion of said first side flange defining one end of said opening abuttingly engaged with the outer surface of said first side flange spaced therealong from the other end of said opening, and;

D. Securing the overlap engaged portions of said web together.

4,875,275

NOVEL AUTOMATIC TOOL CHANGER

James Hutchinson, Doylestown, Pa.; Brian Hoffman, Somerville, N.J., and Steven Pollack, Washington Crossing, Pa., assignors to Megamation Incoporated, Princeton, N.J.

Filed Dec. 7, 1987, Ser. No. 129,454
Int. Cl.[4] B23Q *41/00, 5/34, 31/10*
U.S. Cl. 29—568 29 Claims

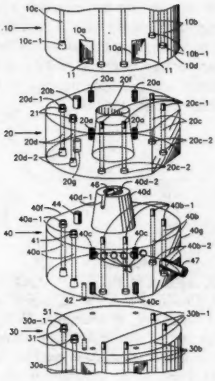
1. Tool changing means for automatically coupling and decoupling first and second members comprising a first flange

adapted to be coupled to one of said first and second members and a second flange adapted to be coupled to the remaining one of said first and second members;

said first flange having a tapered opening and stationary coupling means extending across said tapered opening;

said second flange having a tapered projection adapted to be inserted into said tapered opening;

said tapered projection having radially aligned slots for receiving said coupling means;



locking means arranged for movement within said tapered projection and having a receiving portion for receiving said coupling means; and

said locking means being movable to a first position causing said coupling means to draw said tapers into intimate contact and a second position for releasing said coupling means.

4,875,276

METHOD OF PRODUCING MAGNETIC HEAD DEVICE

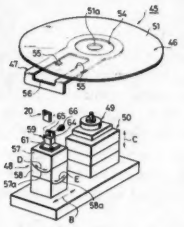
Ryu Yunokuchi; Shinichi Omori, and Masao Ohkita, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Mar. 22, 1989, Ser. No. 327,223

Claims priority, application Japan, Jun. 17, 1988, 63-148182

Int. Cl.[4] G11B 5/42

U.S. Cl. 29—603 **1 Claim**



1. A method of producing a magnetic head with use of a mounting jig which comprises a head projection amount setting member having a flat portion adapted to contact an upper surface of a vacuum generating member formed with a vacuum generating recess and having a recessed portion recessed from said flat portion by a predetermined depth corresponding to a projection amount of a magnetic head to be projected from a substantially central through-hole of said vacuum generating member; a presser member mounted on a side of said flat portion of said head projection amount setting member and provided with presser pawls for holding said vacuum generating member and pressing the same against said flat portion of said head projection amount setting member; an inclination adjusting member for adjusting parallelism of said magnetic head; and a height adjusting member connected to said presser member and said head projection amount setting member for adjusting a vertical position of said head projection amount setting member with respect to said magnetic head; said method comprising the steps of:

mounting said magnetic head to said inclination adjusting member;

contacting said magnetic head with said recessed portion of said head projection amount setting member;

applying light to an upper surface of said magnetic head via said head projection amount setting member under a contact condition of said magnetic head with said recessed portion to generate interference fringes;

adjusting said inclination adjusting member in accordance with said interference fringes to adjust the parallelism of said magnetic head;

mounting said vacuum generating member to said presser pawls of said presser member;

inserting said magnetic head into said through-hole of said vacuum generating member;

contacting again said magnetic head and said vacuum generating member with said recessed portion and said flat portion of said head projection amount setting member, respectively;

applying again light to said magnetic head and said vacuum generating member via said head projection amount setting member to generate interference fringes;

adjusting again said inclination adjusting member in accordance with said interference fringes to adjust the parallelism of said magnetic head and said vacuum generating member; and

fixing said magnetic head to said vacuum generating member.

4,875,277

FORMED METAL CORE BLOCKING METHOD

Richard W. Martin, Versailles; John L. Fisher, Lexington; William R. Fortenberry, Versailles; Randall L. Schlake, Lexington; Ronald F. Dornbrock; James D. Richerson, both of Versailles, and Kenneth E. Marrett, Sr., Lebanon, all of Ky., assignors to Kuhlman Corporation, Troy, Mich.

Division of Ser. No. 906,855, Sep. 12, 1986, Pat. No. 4,833,435.

This application Oct. 12, 1988, Ser. No. 256,883

Int. Cl.[4] H01F 7/06

U.S. Cl. 29—606 **21 Claims**

1. A method for manufacturing a toroidal transformer core blocking, for use with a toroidal transformer of the type having at least two coil assemblies surrounding a toroidal core and providing therebetween a pair of wedge-shaped spaces, comprising the following steps:

creating first and second identically formed steel members, each of said members having a pair of U-shaped coil-engaging faces with inner legs, outer legs and bights, the inner legs joined by a center web; and

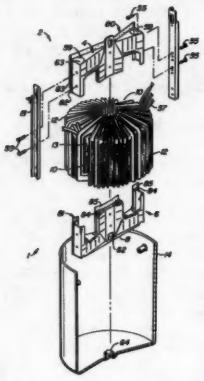
joining the members to form a butterfly-shaped core blocking with first and second wedge-shaped structures sized to fit within the wedge-shaped spaces of the transformer.

19. A method for blocking a toroidal transformer of the type having at least two coil assemblies surrounding a toroidal core and providing therebetween a pair of wedge-shaped spaces, comprising the following steps:

creating first and second identically formed steel members, each of said members having a pair of U-shaped coil-engaging faces with inner legs, outer legs and bights, the inner legs joined by a center web;

joining the members to form a butterfly-shaped core blocking with first and second wedge-shaped structures sized to fit within the wedge-shaped spaces of the transformer;

positioning a top core blocking and bottom core blocking on either side of the transformer with the outer ends of the outer legs opposed; and



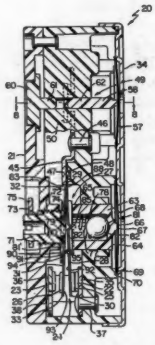
thereafter securing the top and bottom core blockings to one another.

4,875,278

METHOD OF MAKING AN ELECTRICAL SWITCH

Harold A. McIntosh, Crestline, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 885,865, Jul. 15, 1986, Pat. No. 4,736,514, which is a division of Ser. No. 694,350, Jan. 24, 1985, Pat. No. 4,633,211. This application Jan. 19, 1988, Ser. No. 145,053
The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.
Int. Cl.[4] H01H *11/00*
U.S. Cl. 29—622 2 Claims



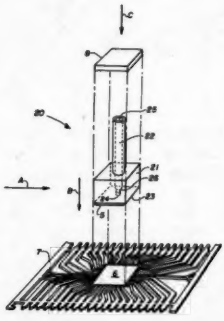
1. In a method of making an electrical switch construction, said method comprising the steps of providing a support means, disposing a fixed contact to be carried by said support means, disposing a switch blade to be carried by said support means and have a movable contact, disposing a bimetallic snap disc to be carried by said support means for controlling movement of said switch blade relative to said fixed contact in response to temperature setting means carried by said support means for selecting the temperature of operation of said disc for moving said movable contact out of contact with said fixed contact, forming said temperature setting means to comprise a substantially cup-shaped plunger means having an open end for engaging said blade and a closed end engaging said snap disc, forming said temperature setting means to have a spring means operatively associated with said plunger means to urge said plunger means into engagement with said snap disc, forming said temperature setting means to have adjusting means for adjusting the force of said spring means that urges said plunger means into said engagement, forming said spring means to have opposed ends one of which is operatively interconnected to said plunger means and the other of which engages said adjusting means, the improvement comprising the steps of disposing said one end of said spring means in said open end of said plunger means, forming said spring means to comprise a coiled compression spring, disposing a ball in said open end of said plunger means so as to engage against said closed end of said plunger means, and seating said one end of said spring means on said ball whereby said ball operatively interconnects said spring means to said plunger means.

4,875,279

DIE ATTACH PICKUP TOOLS

Byron C. Sakiadis, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 88,141, Aug. 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 31,793, Mar. 30, 1987, abandoned. This application Feb. 22, 1988, Ser. No. 158,729
Int. Cl.[4] H05K *13/04*
U.S. Cl. 29—740 10 Claims



1. A die attach pickup tool for picking up a flexible ribbon shaped die attach having a thickness in a range of about 25 to 125 micrometers, an elastic modulus in the range of about 500 to 7,500 N/mm^2 at 23° C. and a first surface area from a first station, transferring the die attach to a heated bond site and depositing the die attach on the bond site, the tool comprising:

a face for contacting the die attach, the face having a second surface area of at least about 1.27 mm square and a hole; and

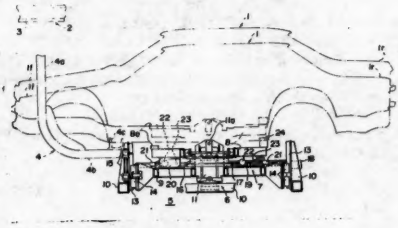
passage means connected to the hole for providing a vacuum through the hole,

such that when each point of the first surface area is in contact with a point of the second surface area or adjacent the hole then, upon turning on the vacuum source, the tool is adapted to pickup and transfer the die attach and, upon turning the vacuum source off, the tool is adapted to deposit the die attach, the picking up, transferring and depositing all occurring while said die attach is in a substantially flat position.

4,875,280
VEHICLE ASSEMBLY LINE

Toyohiko Fujioka, and Hideki Takeshima, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Continuation-in-part of Ser. No. 3,816, Jan. 16, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 273,722
Claims priority, application Japan, Jan. 17, 1986, 61-7602
Int. Cl.[4] B23P *21/00*
U.S. Cl. 29—783 6 Claims



1. A vehicle assembly line including a conveying means which a vehicle body is conveyed from station to station comprising:

a hangar operatively connected to said conveying means, said hanger comprising a suspended portion disposed at an upper portion thereof by which said hanger is suspended from said conveying means, an arm portion extending downward from said suspended portion, and a support portion disposed at an end of said arm portion for horizontally supporting a vehicle body from the lower side thereof, said arm portion passes alongside a portion of a transverse side of the vehicle body when carried by said hanger thereby interfering with access to the portion of the vehicle body for working thereon;

a first working area in which a vehicle body is conveyed while oriented in a first for-aft direction including at least one station whereat operations are performed on an area of the vehicle body that is not interfered with by said arm portion of said hanger;

a vehicle body reversing means located after said first working area, for reversing the fore-aft orientation of the vehicle body with respect to said hanger to a second fore-aft direction, said reversing means adapted to reverse the vehicle body about a vertical axis thereof, whereby the portion of the vehicle body that was interfered with while oriented in the first fore-aft direction by said arm portion of said hanger is moved to a non-interfering position and a portion of the area of the vehicle body not interfered with in said first fore-aft position is moved to a position interfered with by said arm portion while oriented in the second fore-aft direction; and

a secondary working area in which the vehicle body is conveyed while oriented in the second fore-aft direction including at least one station in which operations are performed on the area of the vehicle body that is not interfered with by said arm portion of said hanger and that was previously interfered with by said arm portion in the first fore-aft direction of the vehicle body.

4,875,281
METHOD OF FABRICATING A PRINTHEAD

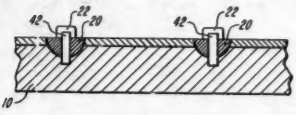
Joseph J. Bakewell, Boxford, Mass., assignor to Dynamics Research Corporation, Wilmington, Mass.

Division of Ser. No. 163,365, Mar. 2, 1988. This application Nov. 28, 1988, Ser. No. 276,865
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—825 9 Claims

1. A method of fabricating a printhead, comprising the steps of:

forming at least one indentation in a conductive sheet along a writing edge of the sheet;

coating the sheet, except for the indentation, with a dielectric substance;



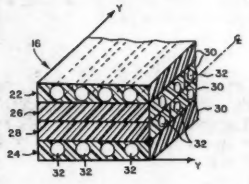
filling the indentation with a dielectric material; and

depositing a plurality of electrodes over the dielectric-filled indentation to form a row of electrodes along the writing edge.

4,875,282
METHOD OF MAKING MULTILAYER PRINTED CIRCUIT BOARD

Joseph D. Leibowitz, Culver City, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 98,260, Sep. 18, 1987, Pat. No. 4,814,945. This application Nov. 7, 1988, Ser. No. 268,127
Int. Cl.[4] H05K *3/36*
U.S. Cl. 29—830 16 Claims



1. A method for fabricating a multilayer printed circuit board, comprising the steps of:

forming a plurality of layers of a composite material by lay-up of an aramid fiber tape, each composite layer including a plurality of layers of the aramid fiber tape;

plating at least one side of some of the composite layers with a layer of copper;

etching the copper layers with predefined circuit patterns; and

laminating the composite layers with insulating adhesive layers to form a printed circuit board having a coefficient of thermal expansion that is approximately equal to that of the electrical components to be mounted on the circuit board.

4,875,283
METHOD FOR MANUFACTURING PRINTED CIRCUIT BOARDS

James A. Johnston, 29 Castle Hill Rd., Windham, N.H. 03087

Division of Ser. No. 929,753, Nov. 13, 1986, abandoned. This application Aug. 25, 1988, Ser. No. 202,096
Int. Cl.[4] H05K *3/36*
U.S. Cl. 29—830 2 Claims

1. A method of making laminated printed circuit boards of the type having outer conductive metallic layers and at least one inner dielectric layer containing heat curable resin comprising the steps of:

assembling a multi-layer book of circuit boards, one on top of another in a press lay-up,

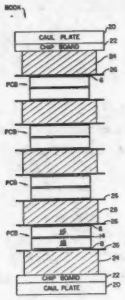
placing a dual purpose separator-release sheet formed of aluminum and coated on both sides with a siloxazane

polymer in engagement with each outer metallic layer of a board,

subjecting the laid-up book to heat and pressure to cure the heat curable resin

separating at least one cured board from the book,

retaining the separator-release sheets in engagement with the outer metallic layers of the separated board and



drilling conductor lead holes in the board with the separator-release sheets attached,

whereby the separator-release sheets serve to prevent the heat curable resin from contaminating adjacent boards in the curing process and serve as drill entry and drill back up material in the drilling process.

4,875,284

PROCESS FOR PRODUCING A PACKAGE FOR PACKING SEMICONDUCTOR DEVICES

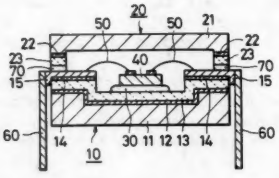
Kiyoshi Ogata; Yasunori Ando; Eiji Kamijo, and Noriaki Matsumura, all of Kyoto, Japan, assignors to Nissin Electric Company, Ltd., Kyoto, Japan

Division of Ser. No. 48,357, May 11, 1987. This application Mar. 14, 1988, Ser. No. 168,056

Claims priority, application Japan, May 9, 1986, 61-107402; May 9, 1986, 61-107403; May 9, 1986, 61-107404

Int. Cl.[4] H05K *3/02*

U.S. Cl. 29—830 **2 Claims**



1. A process of providing interconnections of metal layers in the production of a laminated substrate comprising thin metal layers and electrically insulating thin ceramic layers, comprising:

a first step of evaporating a metal on a first surface of at least one of said thin ceramic layers while in a vacuum with a mask being disposed on said surface of said ceramic layer;

a second step of forming an alloyed area in said ceramic layer by heating said evaporated metal to diffuse said metal into and through said thin ceramic layer to reach a second surface of said ceramic layer; and

a third step of forming one of said thin metal layers on said first surface of said ceramic layer,

so as to create an electrical connection between said one of said thin metal layers and another of said thin metal layers disposed on said second surface of said one of said thin ceramic layers.

4,875,285

APPARATUS AND METHOD FOR EQUIPPING PRINTED CIRCUIT BOARDS WITH COMPONENTS

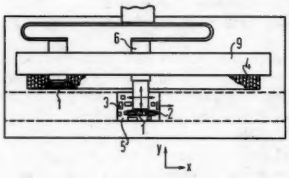
Franz Haan, Bruchsal, and Lothar Hock, Berlin, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 10, 1988, Ser. No. 269,359

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1987, 3738152

Int. Cl.[4] H05K *3/30*; B23P *19/00*

U.S. Cl. 29—832 **7 Claims**



1. A method for equipping printed circuit boards (5) with components (3) using an equipping apparatus having a rotatable equpping head with a plurality of pickup tools, comprising the steps of:

collecting components (3) from delivery units (4) by means of said equipping head;

subsequently equipping a printed circuit board (5) with these components (3);

said delivery units (4) and said printed circuit board (5) being stationary at different locations;

moving said equipping head to locations adjacent said delivery units and adjacent said circuit board at the time of collecting or equipping, respectively;

providing at least one processing station adjacent said equipping head;

rotating said head to provide a clocked passage of said components past said at least one processing station;

and processing said components which are collected while they are in position on said multiple equipping head by use of said at least one processing station when said multiple equipping head has been rotated to bring said components into association with said one or more processing stations 8.

5. Apparatus for equipping printed circuit boards (5) with components (3), particularly in automatic SMD equipping units, comprising, in combination;

at least one rotatable multiple equipping head (1) having a plurality of pick-up tools for components (3);

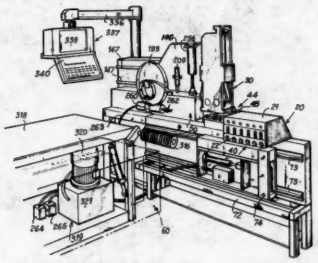
at least one annular device carrier (7) arranged around said multiple equipping head (1) and having processing stations (8) secured thereto;

means for mounting one or more of said multiple equipping heads (1) on a carriage (6), whereby the multiple equipping head (1) together with the apperating device carrier (7) are displaceable and positionable in X and Y directions.

4,875,286
APPARATUS AND METHOD OF MANUFACTURING ELECTRICAL CABLING SYSTEMS

Sergio Leandris, Fenouillet, and Jose Moly, Gratentour, both of France, assignors to Precision Mecanique Labinal, Bois D'Arcy, France

Continuation of Ser. No. 941,320, Dec. 15, 1986, abandoned. This application Jul. 25, 1988, Ser. No. 225,670
Claims priority, application France, Mar. 19, 1986, 86 3927
Int. Cl.[4] H01R *43/00*; B23P *19/00*
U.S. Cl. 29—872 53 Claims



1. A method for manufacturing bundles of electrical cabling systems, wherein said systems comprise a plurality of main conductors and a plurality of secondary conductors, wherein said main conductors comprise a conductor core, an insulating sheath having a plurality of ends, and connection elements connected to said plurality of ends, wherein said connection elements comprise box elements comprising either male plugs or female sockets adapted to engage complementary elements, wherein said secondary conductors comprise a conductor core and an insulating sheath, wherein said core of each of said plurality of main conductors and said plurality of secondary conductors is mounted in said sheath, wherein said method comprises the steps of:

(a) stripping an intermediate portion of at least one main conductor;

(b) stripping at least one secondary conductor in the general vicinity of at least one of the ends of said at least one secondary conductor;

(c) positioning said stripped portions of said main and secondary conductors against one another tightly;

(d) mounting a thimble on said two stripped portions; and

(e) mounting a band of cold-deformable insulating material on said thimble.

8. An apparatus for manufacturing bundles of electrical cabling systems, wherein said cabling systems comprise at least one main conductor having a plurality of ends and at least one secondary conductor having a plurality of ends, wherein said main conductor comprises a conductor core, an insulating sheath surrounding each of said at least one main conductor and an insulating sheath surrounding each of said at least one secondary conductor except for a portion in the general vicinity of at least one of the ends of said secondary conductor thereby creating a stripped portion of said secondary conductor, and connection elements connected to said plurality of ends, wherein said connection elements comprise box elements comprising either male plugs or female sockets adapted to engage complementary elements, wherein said at least one secondary conductor comprises a conductor core and an insulating sheath, wherein said conductor core is mounted in said insulating sheath, wherein said apparatus comprises:

(a) means for stripping said insulating sheath from an intermediate portion of at least one main conductor;

(b) means for positioning the stripped portions of said at least one main conductor and said at least one secondary conductor tightly against one another to produce a splice, said means for positioning being operatively associated in said apparatus with said means for stripping for operation subsequent thereto;

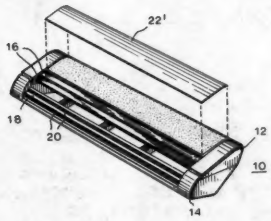
(c) means for mounting a thimble on said two stripped portions at said splice, said means for mounting a thimble being operatively associated in said apparatus with said means for positioning for operation subsequent thereto; and

(d) means for mounting a band of cold-deformable insulating material on said thimble, said means for mounting a band being operatively associated in said apparatus with said means for mounting a thimble for operation subsequent thereto.

4,875,287
SHAVING ARTICLES LUBRICIOUS WHEN WET AND COMPOSITIONS THEREFOR

Walter S. Creasy, Bridgewater, and Donald H. Lorenz, Basking Ridge, both of N.J., assignors to Hydromer, Inc., Whitehouse, N.J.

Filed Nov. 14, 1986, Ser. No. 931,399
Int. Cl.[4] B26B *21/44*
U.S. Cl. 30—34.01 28 Claims



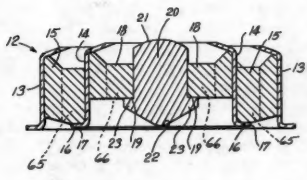
1. A shaving article comprising

at least one blade, a blade support and a skin-engaging portion adjacent a shaving edge of said blade, said skin-engaging portion provided with a hydrogel comprising a water soluble polymer rendered insoluble so as to prevent dissolution of the polymer, whereby the coefficient of friction of said skin-engaging portion is reduced in the presence of water.

4,875,288
SHAVING DEVICE

Robert A. Trotta, Pembroke, and Jeffrey C. Cerier, Franklin, both of Mass., assignors to The Gillette Company, Boston, Mass.

Filed Sep. 2, 1987, Ser. No. 92,264
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[4] B26B *21/00*
U.S. Cl. 30—49 35 Claims



1. A shaving system of the wet shave type comprising:

a plurality of razor blades, each of said razor blades having

a generally tubular upstanding wall of a predetermined height and defining a central aperture, said wall having an upper and lower end, each of said razor blades having an integrally formed, inwardly facing flange on said upper end, the inner edge of each of said inwardly facing flanges having an annular sharpened cutting edge, each of said razor blades having integral outwardly facing flange structure for controlling the vertical position of each of said razor blades; and

a top member having an upper and lower face and having a thickness less than the height of said upstanding wall of each of said razor blades, said top member including an array of spaced apertures, each said aperture having a shape generally corresponding to the outer surface of said tubular upstanding wall of a razor blade, one of said razor blades disposed in each of said apertures of said top member for vertical movement relative thereto, said top member including surface structure that cooperates with said integral outwardly facing flange structure of each of said razor blades to control relative vertical movement between each of said razor blades and said top member in response to shaving forces.

4,875,289

CHISEL FOR REMOVING DAMAGED BOLTS, NUTS AND SCREWS

Denzil C. Poling, Rte. 6, Box 80, Hagerstown, Md. 21740

Filed Apr. 4, 1988, Ser. No. 177,145
Int. Cl.[4] B26B *3/00*
U.S. Cl. 30—167 21 Claims

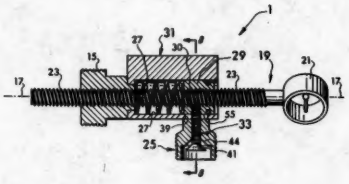
1. A device for rotationally disengaging a first threaded member from a second threaded member engaged therewith, comprising a chisel having at one end thereof a cutting edge for cutting into and penetrating a surface of the first threaded member, the chisel further including a first chisel face, one side of which is defined by said cutting edge, and a stop face positioned away from the cutting edge wherein said stop face meets the first chisel face and is continuous with said first chisel face, said first chisel face being disposed between the stop face and the cutting edge, the stop face being at an angle with respect to said first chisel face of about 90 degrees or less, said cutting edge having a width that is about equal to or greater than the distance between said stop face and said cutting edge, the stop face preventing further penetration of the cutting edge into the first threaded member beyond the stop face so as to provide for application of rotational force to the first threaded member by the chisel without further penetration of the cutting edge into the first threaded member.

4,875,290

WINDAGE LOCKING APPARATUS FOR AN ARCHERY BOW SIGHT

Jack A. Finch, Broken Arrow, Okla., assignor to ACCRA Manufacturing Co., Broken Arrow, Okla.

Filed Aug. 1, 1988, Ser. No. 226,945
Int. Cl.[4] F41G *1/46*
U.S. Cl. 33—265 19 Claims



1. In an archery bow sight having:

an aperture member with a sighting portion and an elongated threaded portion with said elongated threaded portion extending along a first axis away from the sighting portion,

a barrel member extending about said first axis and about at least a section of the elongated threaded portion of said aperture member, said barrel member having a first threaded bore therethrough extending along said first axis, said first threaded bore of said barrel member and the threaded portion of said aperture member having mating threads wherein said the threaded portion of said aperture member can be screwed relative to said barrel member about said first axis into the first threaded bore of said barrel member, and

a body member extending about said first axis, said body member having a first bore therethrough extending along said first axis, said body member also extending about at least a section of said barrel member and said section of the threaded portion of said aperture member, the improvement including:

common means for preventing movement of said aperture member, barrel member, and body member relative to each other about and along said first axis, said common means including a single, threaded set screw, a second bore in said body member, a second threaded bore in said barrel member, and a locking knob with a threaded bore, said second bore in said body member and said second threaded bore in said barrel member extending substantially radially outwardly of said first axis and having at least portions thereof aligned with each other to receive said set screw therein, the threads of said set screw, second bore in said barrel member, and bore of said locking knob all mating wherein said single set screw can be screwed through said aligned portions of said second bores in said body and barrel members to a first position abutting the threaded portion of said aperture member and extending through said aligned portions of said second bores of said barrel and body members to prevent movement of said aperture member, barrel member, and body member relative to each other about said first axis, said set screw in said first position protruding outwardly of said body member relative to said first axis wherein said locking knob can be screwed onto the portion of the set screw protruding outwardly of the body member and selectively tightened thereon in a first rotational direction to a locking position to draw said barrel member into frictional contact with said body member to prevent movement of said barrel member and aperture member along said first axis relative to said body member.

4,875,291

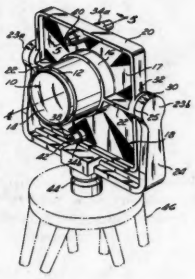
ROTATING REFLECTOR PRISM AND TARGET

Kenneth L. Panique, Orange, and Jeffrey B. Frank, Santa Ana, both of Calif., assignors to Omni Optical Products, Inc., Santa Ana, Calif.

Continuation-in-part of Ser. No. 28,615, Mar. 20, 1987, abandoned. This application Apr. 28, 1988, Ser. No. 187,089

Int. Cl.[4] G01C *15/06*; G02B *7/18*

U.S. Cl. 33—293 22 Claims



1. A combined sighting target and bracket for receiving a retro-reflecting device for use in conjunction with remotely located electronic distance measuring instruments, comprising:

means for receiving a retro-reflecting device to position an optical axis of said retro-reflecting device along a predetermined axis;

a target, connected to said receiving means, for coarse alignment of an incident beam of energy, said target being oriented substantially perpendicular to said predetermined axis; and

first rotational means for rotating said target and said receiving means simultaneously in elevation, said rotational means allowing 360° rotation when a retro-reflective device is positioned in said receiving means.

4,875,292

CONTROL SYSTEM FOR EARTH BORING TOOL

Paul N. Gibson, Saluda, S.C., assignor to Ronald L. McFarlane, Buffalo Grove, Ill.

Filed Apr. 8, 1986, Ser. No. 849,537

Int. Cl.[4] E21B *47/02*

U.S. Cl. 33—304 19 Claims

1. A monitor/control system for an earth boring tool to determine the spatial orientation of said tool at a remote location and to adjust the path thereof to maintain a predetermined course, said system comprising:

(a) vertical position detector means for ascertaining the elevation of a moving boring tool relative to a desired course, including a sensor head for operative engagement with said tool, pressure sensor means for developing a signal representative of a pressure differential existing at said sensor head, and a closed fluid circuit communicating between said sensor head and said sensor means;

(b) horizontal position detector means for ascertaining the azimuth of said tool relative to said course, including magnetic resolver means in operative engagement with said tool for developing a signal representative of a localized flux differential in an ambient magnetic field; and,

(c) path correction means secured to said tool for adjusting its route relative to said course, including deflection means for bearing against the bore hole created by said moving tool.

4,875,293

GOLF CLUB MEASURING DEVICE

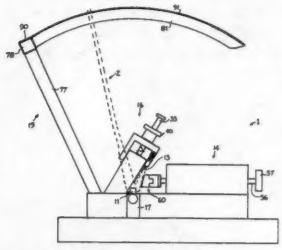
Peter D. Wakefield, Gerrards Cross, England, assignor to Delfield Precision Engineering Limited, Southall, England

Filed Nov. 16, 1987, Ser. No. 121,348

Claims priority, application United Kingdom, Nov. 17, 1986, 8627419

Int. Cl.[4] G01B *5/24*

U.S. Cl. 33—508 4 Claims



1. A golf club measuring device comprising clamping means for releasably retaining a head of a gold club in a fixed reference position and measuring means for determining the inclination of the shaft of the gold club relative to the head, wherein the clamping means comprises a first movable jaw to urge a striking face of the club head against first reference means and a second jaw movable to urge a sole of the club head against second reference means, third reference means for abutment against a part of a hosel of a golf club when the head of the latter is retained in its fixed reference position, and mounting means for mounting the third reference means in either of two positions on opposite sides of the other reference means.

4,875,294

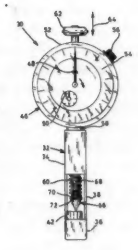
GAUGE FOR DETERMINING DEPTH OF CUT IN KEYS AND THE LIKE

Robert C. Jefferson, 1209 E. 2nd Ave., Lenoir City, Tenn. 37771

Filed Dec. 19, 1988, Ser. No. 286,260

Int. Cl.[4] G01B *5/20*

U.S. Cl. 33—539 19 Claims



1. A gauging device for the rapid and accurate measurement of the depth of cut in keys, which comprises:

a yoke member having first and second substantially parallel

leg members and a back member, said leg members and said back member defining a C-shaped opening;

an anvil member carried by said second leg member, said anvil member having a flat surface directed toward said first leg member, said flat surface being a reference point for said gauge;

a reciprocatable and non-rotating spindle member carried by said first leg member, said spindle member having an axis oriented perpendicularly to said flat surface of said anvil member, said spindle member having a first end and a distal end;

a displacement measuring means attached to said first end of said spindle member, said displacement measuring means providing visual readout of axial displacement of said spindle member from said reference point;

a tip member threadably secured to said distal end of said spindle member for selective contact with said flat surface of said anvil member to zero said gauge and selective contact with the cut of the key being measured to axially displace said spindle member; and

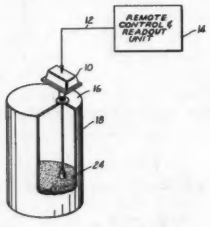
means to bias said tip member toward said flat surface of said anvil member.

4,875,295

DROP-WEIGHT MATERIAL LEVEL INDICATOR

Phillip P. Fleckenstein, Port Huron, Mich., assignor to Silomaster, Inc., Port Huron, Mich.

Filed Jul. 11, 1988, Ser. No. 217,695
Int. Cl.[4] G01F *23/04*
U.S. Cl. 33—720 **8 Claims**



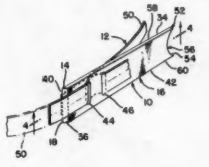
1. A drop-weight material level indicator comprising: support means adapted to be mounted above a material surface whose level is to be sensed; a spool mounted on said support means to rotate about a fixed spool axis; a drop line attached at one end to said spool and having a drop weight suspended from the other end; a motor rotationally coupled to said spool selectively for winding and unwinding said drop line on said spool; an arm mounted on said support means to pivot about a fixed pivot axis; spring means coupled to said arm and to said support means for biasing said arm to pivot in one direction; a first idler pulley freely rotatably carried by an end of said arm remote from said lever axis; a second idler pulley freely rotatably carried by said support means, said drop line being trained from said spool over said first and second idler pulleys such that tension in said drop line urges said arm to pivot in a second direction opposite to said one direction against force of said spring means; level sensing means including means responsive to rotation of said second pulley for indicating material level; and means responsive to motion of said arm about said pivot axis for sensing rupture of said drop line.

4,875,296

ANATOMICAL MEASURING DEVICE

John P. Holzmeister, and June Holzmeister, both of 9810 Blomberg St. SW., Olympia, Wash. 98502

Continuation of Ser. No. 285,998, Jul. 23, 1981, abandoned. This application Oct. 3, 1983, Ser. No. 538,537
Int. Cl.[4] G01B *3/10*
U.S. Cl. 33—770 **2 Claims**



1. An anatomical measuring device primarily used for determining the circumferential size of a body portion, yet being used also for mroe readily determining inseam lengths and other linear lengths, the latter use being similar to the use of a conventional tape, comprising:

a) a finger held handle having a commencing transverse tapered zero measurement end, and a terminating guiding end, an inside planar surface for placement toward a person's body, an outside planar surface for placement away from a person's body, a first transverse slot spaced from the zero measurement end through which a free end of a measuring tape after encircling a body portion and passing over the aero measurement end, may be inserted, commencing from the outside planar surface, and a second transverse slot, spaced from the first transverse slot, through which a free end of the measuring tape may be inserted, after passing through the first transverse slot and along the inside planar surface, commencing from the inside planar surface and thereafter passed over the outside planar surface and drawn in alignment with a finger held handle, until a wanted loop size of a measuring tape is reached about a body portion, and thereafter this loop size about a body portion is maintained by the restraint, which is created by the friction developed, as portions of a measuring tape are then closely positioned through the first and second transverse slots and along the inside planar surface between these spaced transverse slots; and

b) a measuring tape having a zero end secured in transverse alignment with the transverse tapered zero measurement end of the finger held handle, adjacent the inside planar surface of the finger held handle, and a free end for directly creating an encircling portion of the tape around a body portion, and the free end for passing directly over the transverse tapered zero measurement end after encircling a body portion, and then for insertion, commencing from the outside planar surface of the finger held handle, through the first transverse slot spaced from the zero measurement end, and continuing for passing closely adjacent the inside planar surface, until reaching the second transverse slot, spaced from the first transverse slot, and continuing for insertion through the second transverse slot, and then continuing along the outside planar surface until reaching and passing the terminating end of the finger held handle, and remaining pullable until an encircling dimension around a body portion is finally determined, and then remaining stationary under the friction force, while the measurement is easily read, where the portions of the tape pass over the zero measurement ends of both the measuring tape and the finger held handle, so the size measurement being sought is easily observed in respect to the transverse portion of the measuring tape, then located in transverse alignment with both these respective zero measurement ends of the measuring tape and the finger handle.

4,875,297

DEVICE FOR TREATING A MATERIAL WEB

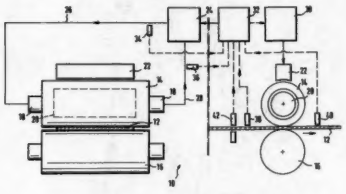
Heinz-Michael Zaoralek, Königsbronn, Fed. Rep. of Germany, assignor to Schwabische Huttenwerke GmbH, Postfach, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 206,679

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, 3720132

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—48 **18 Claims**



1. A device for treating a material web, comprising:

a heating roller, said heating roller including means for introducing heat carrier fluid into the interior of said heating roller at a controlled temperature;

a counter roller, proximate said heating roller, defining a material web path therebetween;

a heat source, proximate said heating roller adapted to heat the surface of said heating roller; and

a control means adapted to control the temperature difference between the interior and the surface of said heating roller.

4,875,298

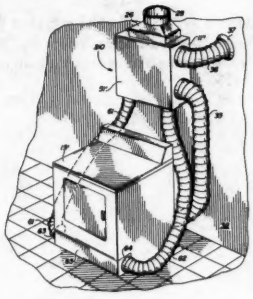
PREHEATER FOR CLOTHES DRYER

Robert L. Wright, 1113 Quintuplet Dr., Casselberry, Fla. 32707

Filed Oct. 14, 1988, Ser. No. 258,011

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—86 **16 Claims**



1. In an air intake preheater for a clothes dryer or the like, in which hot, moisture-laden air exhausted from the dryer is used to preheat fresh, ambient air drawn into the dryer, the preheater having a first conduit connected for flowing the exhausted air from the dryer to a discharge point, and a second conduit connected for flowing the ambient air, in heat exchange relationship with the exhausted air flowed through the first conduit, from a source of ambient air to the dryer, the first and second conduits communicating in air flow relationship through the dryer, the improvement comprising:

the first conduit being directed through the second conduit along a looping path that provides first and second transverse crossings in series in opposite directions of the air flow in the first conduit relative to the air flow in the second conduit, the first crossing being downstream of the second crossing in the air flow in the second conduit, the first conduit being connected at its first crossing to the dryer and at its second crossing to the discharge point.

4,875,299

SKI BOOT

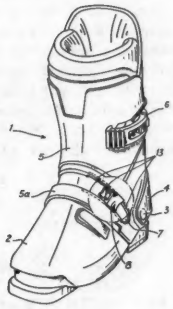
Michel Mabboux, Seynod; Jean-Louis De Marchi, St. Jorioz, and Fabrice Legon, Seynod, all of France, assignors to Salomon S. A., Annecy Cedex, France

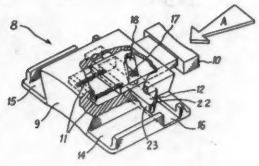
Continuation of Ser. No. 931,104, Nov. 17, 1986, abandoned. This application Jul. 26, 1988, Ser. No. 224,278

Claims priority, application France, Nov. 15, 1985, 85 16911

Int. Cl.[4] A43B *5/04*

U.S. Cl. 36—117 **32 Claims**





1. Ski boot of the type comprising a shell base on which is articulated an upper which, during forward flexion, contacts said shell base with its front lower edge, said front lower edge comprising a movable abutment for transmission of forces which is displaceable transversely from one side of the front lower edge to at least its middle portion located at the instep, said abutment having the form of a cursor, wherein said cursor is constituted by

(a) a body having at least one lateral rail cooperating with a corresponding groove of said front lower edge, and in which a movable locking means moves perpendicularly to said rail in one of corresponding recessed housings provided in the front lower edge; and

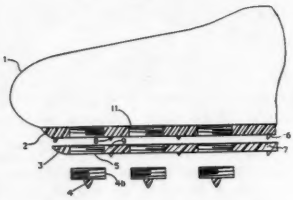
(b) a push means moving perpendicularly to the movement of said locking means and cooperating with the latter by means of a ramp means so that every displacement of said push element acts on said locking means, said locking means comprising a detent held by elastic means against a surface arranged in said push means.

4,875,300

TRACK SHOE WITH A DETACHABLE SPIKE PLATE BY THE USE OF PLASTIC SPIKES

Michael Kaxx, 931 N. Norris, Tucson, Ariz. 85719-4948

Filed Aug. 5, 1988, Ser. No. 228,732
Int. Cl.[4] A43B 5/00
U.S. Cl. 36—134 14 Claims



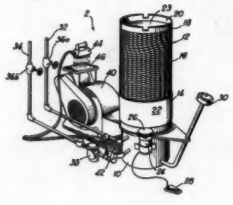
10. A track shoe having an outsole comprised of a synthetic material that has a low coefficient of thermal expansion, the outsole having a plurality of threaded openings therein; a plurality of spikes mounted in the threaded openings; a spike plate mounted adjacent the outsole, the spike plate having threaded holes therein aligned with the openings in the outsole such that the spikes are engaged with both the spike plate and the outsole; and the outsole being formed of a synthetic material with a Shore A hardness of 50 to 90 and containing projections for aligning the outsole with the spike plate for its attachment with spikes.

4,875,301

CYLINDERICAL APPARATUS FOR HOLDING TABLE SKIRTING FOR WRINKLE REMOVAL

Charles A. Adams, 3760 Sherbrook Ct., College Park, Ga. 30349

Filed Sep. 15, 1988, Ser. No. 244,282
Int. Cl.[4] D06F 69/00, 73/00
U.S. Cl. 38—14 12 Claims



1. An apparatus for removing wrinkles from a table skirt comprising:

(a) a vertically oriented cylinder capable of holding a table skirt and being porous along a portion of its length;

(b) means for rotating said cylinder whereby a table skirt may be wound around said cylinder in an overlapping manner;

(c) a flange provided on the upper portion of said cylinder;

(d) clipping means capable of clipping said table skirt to said flange and around said cylinder in an overlapping manner as said cylinder rotates; and

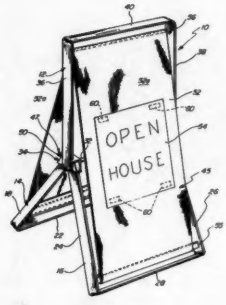
(e) means for delivering steam from an outside source through said porous portion of said cylinder for removing the wrinkles from said wound table skirt.

4,875,302

COLLAPSIBLE DISPLAY SIGN

Alfred A. Noffsinger, 73-271 Haystack Rd., Palm Desert, Calif. 92260

Filed Apr. 7, 1988, Ser. No. 178,597
Int. Cl.[4] G09F 15/10
U.S. Cl. 40—610 13 Claims



1. A portable and foldable sign apparatus, comprising:

a first support frame member;

a second support frame member;

said first and second support frame members being hinged together so as to be positioned between a closed folded position and an open extended position;

a slidable frame member slidably engaged with said first and second support frame members, whereby the positioning of said slidable frame member controls the positioning of said first and second support frame members;

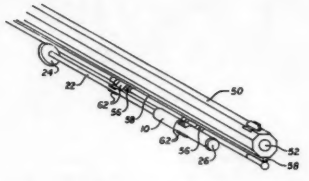
biasing means attached to said first and second support frame members engageable with said slidable frame member, whereby said support frame members are held in a relatively fixed closed or open position with respect to said slidable frame member.

4,875,303

MUZZLELOADING POWDER AND PROJECTILE TOOL

William R. DeWeert, 1560 Dammeron Valley Dr., E., and Frank Manning, 2153 Dammeron Valley Dr., E., both of Dammeron Valley, Utah 84783

Filed Mar. 25, 1988, Ser. No. 173,549
Int. Cl.[4] F41C 27/00
U.S. Cl. 42—90 10 Claims



1. A firearm attachable, muzzleloading reloading tool comprising:

an end cap for closing an end of a body, said end cap being attached frictionally upon said body which is cylindrically tubular and axially elongated and is of sufficient size circumferentially and of such axial length so as to provide for the containment telescopically within of an inner sleeve which is a cylindrical tubular member that contains a powder projectile propellant and a type of projectile;

a cylindrical bushing of such diameter so as to be slideably inserted into an end of said body, such cylindrical bushing

being longitudinally sufficient in length as to provide for an annular groove circumferentially located on said bushing;

said bushing containing a cylindrical hole longitudinally axial in said bushing located at a median on the diametral axial ends of said bushing;

said bushing being contained frictionally within said body by a compressive tension retaining clip, which is compressively contained on said body, said compressive tension retaining clip being accessed to said bushing through a retaining clip slot aperture;

a plunger shaft being cylindrical and axially longitudinal, the end of said plunger shaft contained within said body is flared, the flare being of sufficient size to prohibit retraction of said plunger shaft axially through said hole in said bushing; and

said plunger shaft insertingly attached to a hole in a handle at the diametrically opposite end of said flare, said attachment facilitated by a vinculum bonding.

4,875,304

THUMB CONTROLLED FISHING LINE, CASTING DEVICE

Arthur J. Hansen, 34 Charles St., B-4, Westwood, N.J. 07675

Filed Mar. 28, 1989, Ser. No. 329,443
Int. Cl.[4] A01K *87/00*
U.S. Cl. 43—25 **1 Claim**

1. A combination fishing rod, fishing reel, fishing line, and a thumb controlled casting means comprising:

a fishing rod, reel, and line mounted thereon;

a thumb controlled fishing line casting means comprising: a tubular means having a longitudinal opening along a bottom portion for mounting snugly upon a foregrip of said fishing rod;

said casting means further comprising:

a ridge portion running longitudinally from a raised position, at one end of said casting means top portion, to a lowered position at one other end;

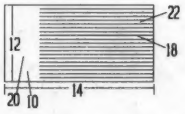
whereby, said casting means mounted on said foregrip said rod is operated by: first, placing said line along said ridge and placing ones thumb upon said ridge and line, and second, casting said rod wherein said line will slide out from under ones thumb and thus releasing said line from said thumb controlled casting means.

4,875,305

SLOWLY DISSOLVING FISHING LURE ATTACHMENT WITH SCENT MIXTURE

John O. Bridges, 525 W. Ash St., Fullerton, Calif. 92632

Filed Feb. 17, 1989, Ser. No. 311,748
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.06 **12 Claims**



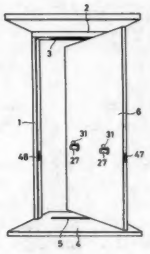
1. A fishing lure which comprises a body have the property of a slow dissolution rate in water and containing a fish attractant embedded within said body so that when said body dissolves in a body of water, said fish attractant is released into said water wherein said body is formed of polyvinyl alcohol having a limited rate of water dissolution.

4,875,306

DOOR APPARATUS

Mituru Itoh, No. 2-6, Inohana 3-chome, Chiba-shi, Chiba-ken, Japan

Filed Jun. 23, 1988, Ser. No. 210,694
Claims priority, application Japan, Dec. 21, 1987, 62-323453
Int. Cl.[4] E05D *15/56*
U.S. Cl. 49—208 **1 Claim**



1. A door apparatus, comprising:

two posts vertically fitted onto a sidewall of an entrance;

a beam disposed within a proximity of an upper end portion of said two posts, said beam having a U-shaped longitudinal sectional shape and equipped on a bottom plate thereof with an elongated hole having a predetermined length in a longitudinal direction;

a substantially rectangular upper guide plate disposed at an upper part of said beam, wherein said upper guide plate has a lower surface, a linear support shaft guide groove on said lower surface having a direction and a length substantially equal to said elongated hole of said beam, and a piece guide groove formed on said lower surface by superposing two strips of stirrup-like grooves having a linear portion in such a manner that the linear portion of each of said stirrup-like grooves faces each of said posts;

a floor plate fitted in the proximity of a lower end portion of said posts, and wherein said floor plate has an elongated hole having a direction and a length substantially equal to those of said elongated hole of said beam;

a rectangular lower guide plate fitted to a lower portion of said floor plate, and wherein said lower guide plate has an upper surface, a plurality of piece guide grooves on said upper surface, each piece guide groove has substantially the same shape as that of said piece guide groove of said upper guide plate and a lower support shaft guide groove on said upper surface having substantially the same shape as that of said upper support shaft guide groove;

upper and lower support shafts fixed to the center of a hollow door and disposed between said two posts in the transverse direction of said door;

said upper support shaft being hollow and inserted through said elongated hole of said beam and supported by said beam in such a manner as to be movable while being rotated along said elongated hole of said beam;

piece elevation levers each having a support frame fixed at right angles to an upper end of said upper support shaft in parallel with said door, said piece elevation levers being fitted rotatably in the vertical direction to the center of said support frame in the longitudinal direction thereof;

two member pieces fitted to outer end portions of said piece elevation levers and fitted into said piece guide grooves of

said upper guide plate when said member pieces rise, wherein said lower support shaft being inserted into said elongated plate of said floor plate;

a piece support plate fixed vertically to a lower end portion of said lower support shaft in parallel with said door;

other pieces fitted pivotally to outer end portions of said piece support plate and fitted into said piece guide grooves of said lower guide plate;

a knob mechanism which comprises:

a shaft member having an axial elongated groove on an apex thereof, wherein said shaft member penetrates through said door in the longitudinal direction;

cylindrical cover means for supporting an end portion of said shaft member, said cylindrical cover means being fixed to the same front or rear position of said door and equipped with an elongated hole in an axial direction on the apex thereof;

slide plates, each being slidably fitted between an inner surface of said cylindrical cover means and an upper surface of said shaft member, each slide plate being equipped with a projection extending vertically at an inner end thereof and having a semi-circular sectional shape;

other slide plates, each being equipped at an outer end thereof with a ring which is fitted, from outside to said shaft member and at an inner end thereof, with a projection extending vertically, and having a main body portion which has a semi-circular sectional shape and slides along a lower surface of said shaft member, wherein said projection is more inward than said projection of said slide plate;

operation plates, each having a portion which has a semi-circular sectional shape and enters between said two slide plates, and slides along said shaft member; and

operation rods, each being fitted at the lower end portion thereof into said key groove of said shaft member while penetrating longitudinally through said portion of said operation plate having a semi-circular sectional shape, each of said operation rods being equipped at an upper end portion thereof with a knob projection from said elongated hole of said cylindrical cover,

wherein when said knob of said knob mechanism is pushed, said piece elevation lever connected to said pushed knob rotates and said member piece at the outer end portion of said piece elevation lever rotated by said pushed knob fits into said piece guide groove of said upper guide plate, and when said knob is pulled, said piece elevation lever connected to said pulled knob rotates and said member piece at the outer end portion of said piece elevation rotated by said pulled knob fits into said piece guide groove of said upper guide plate.

4,875,307

WINDOW FOR A MOTOR VEHICLE DOOR

Mario Barbero, Torino, Italy, assignor to Fiat Auto S.p.A., Torino, Italy

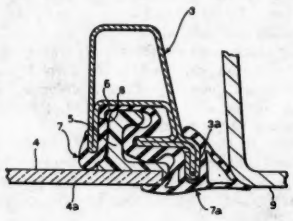
Filed Sep. 14, 1988, Ser. No. 244,272

Claims priority, application Italy, Sep. 14, 1987, 67779 A/87

Int. Cl.[4] E05F *11/38*; E06B *7/16*

U.S. Cl. 49—374 **4 Claims**

1. A window for a motor vehicle door, comprising a frame (3) defining a window opening and a pane of glass (4) guided vertically in the frame (3) and arranged so that, when it is in the raised position, its outer surface is substantially flush with the adjacent surfaces of the bodywork of the motor vehicle, wherein the rear edge of the glass is provided with two appendages (5) which are guided for sliding in a channel (6) formed in a weather strip (7) fixed to the window frame (3) and having an auxiliary portion (7*a*) which serves both as the seal



between the glass (4) and the door frame (3) and as the seal between the door frame (3) and the body of the motor vehicle.

4,875,308

ADJUSTABLE INSULATING GLASS WINDOW

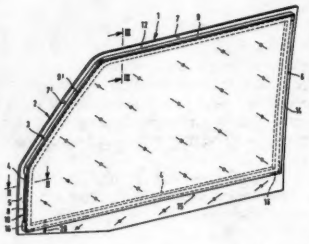
Dieter Peetz, Aachen; Peter Scheeren, Monschau; Hans-Peter Siemonsen, Aachen; Ralf Reinicke, Koln; Lothar Witting, Neunkirchen-seelscheid, and Aloisius Schafhausen, Troisdorf, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Jan. 27, 1988, Ser. No. 148,823

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 3702402

Int. Cl.[4] E06B *3/00*

U.S. Cl. 49—501 **46 Claims**



1. An insulating glass window comprising first and second glass sheets, a profile strip and a bonding strand separating and bonding the two glass sheets to one another and sealing an intermediate air space, characterized in that said bonding strand is located inward relative to peripheral edge surfaces of the two glass sheets thereby forming a groove into which said profile strip is placed, said profile strip having at least one projection element directed toward said bonding strand and partially inserted into and anchored in said strand, and capable of maintaining an external periphery surface of said profile strip in flush relation with the peripheral edge surface of at least one of said glass sheets.

4,875,309

DISC CLEANER

William W. Long, III, Hagerstown, Md., assignor to Pangborn Corporation, Hagerstown, Md.

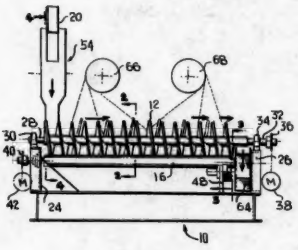
Filed Dec. 17, 1987, Ser. No. 134,092

Int. Cl.[4] B24C *3/14*

U.S. Cl. 51—419 **15 Claims**

1. A feed unit for use in an abrasive cleaner machine for circular generally plate-like workpieces, said feed unit comprising two parallel support shafts equally transversely spaced

relative to and parallel to an axis for supporting and rotating a single row of workpieces about said axis, first drive means connected to said support shafts for rotating said support shafts to effect rotation of workpieces seated thereon, two parallel screw type conveyors equally transversely spaced parallel to said axis and above said support shafts for receiving work-



pieces seated on said support shafts and advancing such workpieces along said single row, second drive means connected to said screw type conveyors for rotating said screw type conveyors to move workpieces along said support shafts, said first and second drive means being independent of one another wherein speed of rotation of a workpiece is independent of advance rate of a workpiece.

4,875,310

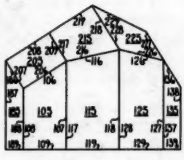
MODULAR BUILDING

Ernest P. Shaughnessy, 507 14th Ave. North, Nampa, Id. 83605

Continuation-in-part of Ser. No. 190,467, May 5, 1988, abandoned. This application May 1, 1989, Ser. No. 346,313

Int. Cl.[4] E04B *1/32*

U.S. Cl. 52—81 **2 Claims**



1. A ten sided polyhedron building structure for automated continuous production and manufacture which comprises:

three small right handed trapezoidal shaped side panels each having a top inclined edge of length T and a pair of parallel side edges, right hand edge of length Y and left hand edge of length Z, where Y is greater than Z and where said right and left hand edges are separated by a given width, say w;

three small left handed trapezoidal shaped side panels each having a top inclined edge of length T and a pair of parallel side edges, left hand edge of length Y and right hand edge of length Z, where Y is greater than Z and where said right and left hand edges are separated by said given width w;

two large right handed trapezoidal shaped side panels each having a top inclined edge of length t, where t is less than T, and a pair of parallel side edges, right hand edge of length X and left hand edge of length Y, where X is greater than Y and where said right and left edges are separated by said given width;

to large left handed trapezoidal shaped side panels each having a top inclined edge of length t and a pair of parallel side edges, left hand edge of length X and right hand edge of length Y, where said right and left edges are separated by said given width say w;

said side panels being vertically oriented wherein

a first small right handed trapezoidal shaped side panel is joined along its right edge to the left hand edge of a first large right handed trapezoidal shaped side panel such that said first small right handed trapezoidal shaped side panel and said first large trapezoidal shaped side panel form a 144° dihedral angle there between;

wherein a first large left handed trapezoidal shaped side panel is joined along its left hand edge to the right hand edge of said first large right handed trapezoidal shaped to form a 144° dihedral angle there between;

wherein a first small left handed trapezoidal shaped side panel is joined along its left hand edge to the right hand edge of said first large left handed trapezoidal shaped side panel to form a 144° dihedral angle there between;

wherein a second small right handed trapezoidal shaped side panel is joined along its left hand edge to the right hand edge of said first small left handed trapezoidal shaped side panel to form a 144° dihedral angle there between;

wherein a second large right handed trapezoidal shaped side panel is joined along its left hand edge to the right hand edge of said second small right handed trapezoidal shaped side panel to form a 144° dihedral angle there between;

said third small right handed trapezoidal shaped side panel and along its right edge to the left edge of said first small right handed trapezoidal shaped side panel to form a ten sided enclosure having interior dihedral angles of 144°;

two right handed trapezoidal shaped closure panels each having a top inclined edge of length T and a bottom inclined edge of length t and a pair of parallel side edges, right hand edge of length V and left hand edge of length T, where V is greater than T and where said right and left edges are separated by said given width;

two left handed trapezoidal shaped closure panels each having a top inclined edge of length T and a bottom inclined edge of length t and a pair of parallel side edges, left hand edge of length V and right hand edge of length T, where said right and left edges are separated by said given width;

four rhombus shaped closure panels each having four equal length edges of length T and a pair of major interior face angles and a pair of minor interior face angles;

said closure panels being attached to said side panels wherein

a first rhombus shaped closure panel is attached along a first and a second edge to the top inclined edges of said first small right handed trapezoidal shaped side panel and of said third small left handed trapezoidal shaped closure panel;

a first right handed trapezoidal shaped closure panel is attached along its bottom inclined edge to the top inclined edge of said first large right handed trapezoidal shaped side panel and further along its left hand edge to a third edge of said first rhombus shaped closure panel;

a first left handed trapezoidal shaped closure panel is attached along its bottom inclined edge to the top inclined edge of said first large left handed trapezoidal shaped side panel and further along its left hand edge to the right hand edge of said first right handed trapezoidal shaped closure panel;

a second rhombus shaped closure panel is attached along a first and a second edge to the top inclined edges of said second small left handed trapezoidal shaped closure panel and said second small right handed trapezoidal shaped side panel and further along a fourth edge to the right hand edge of said first left handed trapezoidal shaped closure panel;

a second right handed trapezoidal shaped closure panel is attached along its bottom inclined edge to the top inclined edge of said second large right handed trapezoi-

dal side panel and along its left hand edge to a third edge of said second rhombus shaped closure panel and further attached along its top inclined edge to the top inclined edge of said first left handed trapezoidal closure panel;

a second left handed trapezoidal closure panel is attached along its bottom inclined edge to the top inclined edge of said second large left handed trapezoidal shaped side panel and along its left hand edge to the right hand edge of said second right handed trapezoidal shaped closure panel;

a third rhombus shaped closure panel is attached along a first and a second edge to the top inclined edges of said second small left handed trapezoidal shaped side panel and said second small right handed trapezoidal shaped side panel and further along a third edge to the right hand edge of said second left handed trapezoidal shaped closure panel;

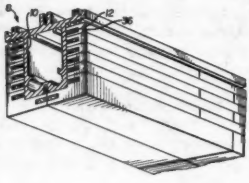
a fourth rhombus shaped closure panel is attached along its first and second edges to the top inclined edges of said second left handed trapezoidal shaped closure panel and said first right handed trapezoidal shaped closure panel respectively, and further along its third and fourth edges to the third fourth edges of said first and third rhombus shaped closure panels.

4,875,311

BEAM CONSTRUCTION

Leo J. Meyers, Pittsburgh, Pa., assignor to Sun Room Designs, Inc., Youngwood, Pa.

Filed Apr. 20, 1988, Ser. No. 183,972
Int. Cl.[4] E04B 7/02; E04C 3/36
U.S. Cl. 52—90 **35 Claims**



1. In a structure such as a sun room, solar room, greenhouse, or the like, a franework for supporting a panel-like comprising:

at least two spaced-apart beam members for supporting said panel-like member threrbetween,

each of said beam members comprising:

an elongated core member having two sides, each said side having an outer surface,

a plurality of spaced-apart projections arranged on said outer surface of said each side, each said projection extending generally coextensively withsaid core member and laterally outwardly on said each outer surface of said core member, and

a plurality of planks on said each side of said core member, each said plank having a lateral open channel adapted to receive one of said projections for mounting of said each plank, and said each plank abutting an adjacent plank to generally enclose said core member,

said plurality of planks having different lengths,

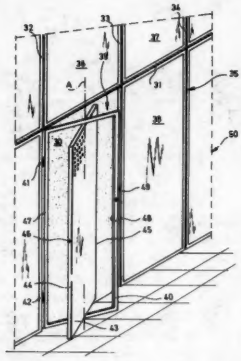
said each projection carrying a number of said planks to form a single row, and said plurality of projections forming several adjacent rows of said planks on said each side of said core member, whereby said planks of a respective row are ataggered relative to said planks of an adjacent row.

4,875,312

WALL PANELLING FOR ALTERING THE ACOUSTIC PROPERTIES OF A WALL

Karl-Günter Schwartz, Worms, Fed. Rep. of Germany, assignor to G & H Montage, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 5, 1988, Ser. No. 152,825
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1987, 3706984
Int. Cl.[4] E04B 1/82
U.S. Cl. 52—144 **6 Claims**



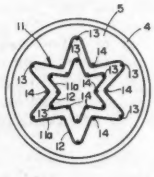
1. A wall panelling for altering the acoustic properties of a wall, comprising said wall panelling being mounted adjacent said wall, a plurality of frames disposed within said wall panelling and adapted to be pivoted relative to said wall panelling about an axis extending along one edge thereof to swing an opposite edge thereof away from said wall, wall elements being substantially plate-shaped and mounted each in one said frame for rotation of at least 180 degrees relative to and independent of rotation of said frame about a predetermined axis, and each said wall element having front and rear faces with different acoustic absorption and reflection properties on said front and rear faces.

4,875,313

DEVICE FOR SUPPRESSING VIBRATION OF STRUCTURE

Takanori Sato, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,325
Claims priority, application Japan, Nov. 17, 1987, 62-290231
Int. Cl.[4] E02D 27/34
U.S. Cl. 52—167 DF **17 Claims**



1. A device for suppressing vibration of a structure, comprising:

a tank having an open central area, and being disposed on the structure, said tank having a circumferential and radial direction with respect to said open central area;

a liquid, contained in the tank, for suppressing vibration of

the structure, the amount of the liquid being such that the natural period of the liquid is substantially equal to the natural period of the structure, said liquid being allowed to vibrate in a horizontal direction; and

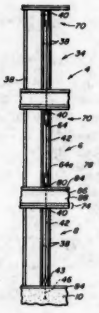
means, disposed within the tank, for damping the vibration of the liquid, the damping means being of a net construction and having a vertical section which includes a plurality of portions, each said portion extending in a direction intersecting said horizontal direction and at least one of said portions extending transverse to both said circumferential and radial directions.

4,875,314

CONNECTION SYSTEM FOR PREVENTING UPLIFT OF SHEAR WALLS

Kenneth T. Bollen, 4 Allemand La., San Anselmo, Calif. 94960

Filed Jan. 6, 1987, Ser. No. 707
Int. Cl.[4] E04H 9/02
U.S. Cl. 52—167 R **16 Claims**



1. For use in a wood framed building of the type including a foundation and first and second levels supported on the foundation, the first and second levels including top and bottom pairs of vertical frame members, horizontal plate members connecting the upper ends of said vertical frame members at both said first and second levels, and sheathing means fixed to said members forming vertical shear walls, said shear walls including upper and lower ends, each of the levels separated by a floor, the floor comprising floor framing, a connecting system for preventing the uplifting of said shear walls from said foundation due to lateral loads induced into the building, the system comprising:

foundation anchor means secured to the foundation and generally vertically aligned with the anchor means; and

a first upper anchor means having coupling means at both ends and a bearing member base plate at its lower end supported on the horizontal plate member of said first building level;

a second upper anchor means vertically aligned with said first upper anchor means and having a bearing base plate member at its lower end supported on the horizontal plate of said second building level;

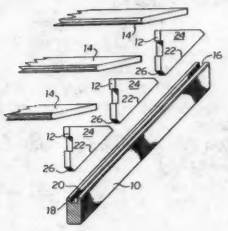
tie rods means located between vertically aligned pairs of vertical frame members for tensively coupling said first and second upper anchor means to one another and to said foundation anchor, whereby vertical uplift loads induced by lateral forces transferred into the first and second level shear walls are transferred to their respective anchor means which in turn transfer the vertical uplift loads to the foundation through the tie rod means and the foundation anchor.

4,875,315

FRAME FOR SUPPORTING STAIRS OR THE LIKE

Vénérand R. Champagne, 8720, des Mille-Isles, Laval, Quebec, Canada (H0A 1G0)

Filed Jun. 13, 1988, Ser. No. 205,831
Int. Cl.[4] E04F 11/10, 11/12, 11/14
U.S. Cl. 52—189 **9 Claims**



1. A frame for supporting a platform, a staircase or the like comprising:

at least two spaced longitudinal beams, each beam having a longitudinal groove centrally located on its upper surface, each of said grooves having a flat rectilinear bottom surface and a uniform width defined by flat, parallel internal walls,

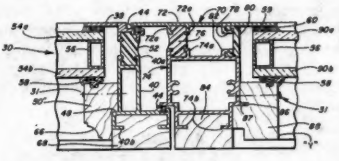
a platform section and a pair of spaced truss beams secured to and under said platform, said truss beams having a flat rectilinear bottom surface across their width, and a uniform width defined by parallel, flat sidewalls, the distance between the said truss beams corresponding to the distance between the longitudingal beams, the full width of said truss beams corresponding to the width of said grooves to allow the truss beams to fittingly slide both downwardly into said grooves and longitudinally along the grooves, the height of said truss beams being greater than the depth of said grooves, the bottom of said truss beams being adapted to rest in the bottom of the grooves while maintaining the platform spaced from the upper surface of the longitudinal beams.

4,875,316

COMBINATION METAL AND WOOD WINDOW FRAME ASSEMBLY

Bernard A. Johnston, 3026 Fairfield Ave., Downers Grove, Ill. 60515

Filed Mar. 27, 1987, Ser. No. 31,527
Int. Cl.[4] E06B 1/04
U.S. Cl. 52—204 **6 Claims**



1. A combination metal and wood window frame assembly having exterior and interior faces, comprising:

a plurality of frame members constituting the rails and stiles of the window frame assembly, each frame member including two metal frame elements, a thermal break member rigidly interconnecting said metal frame elements, and a wooden frame element extending towards the interior face of said frame assembly;

deep-key interconnection means carried respectively by said metal frame member and by said wooden frame element

and cooperable with one another to provide a rigid interlock connection of said wooden frame element with said metal frame member; and

a second wooden frame element which is rigidly deep-key interconnected to at least one of said metal frame elements for providing an interior wooden aesthetic covering to said metal frame member as well as for providing structural rigidity to the overall combination metal and wood window frame assembly.

4,875,317

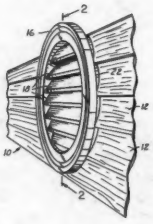
MOLDED VENT

John R. Logan, R.R. #3, Dunn Road, and Donald C. Wickens, Box 4, Bluewater Beach, R.R. #1, both of, Harrow, Ontario N0R 1G0, Canada

Filed Feb. 26, 1988, Ser. No. 161,194

Int. Cl.[4] E06B *3/00*; B29C *17/04*

U.S. Cl. 52—208 **2 Claims**



2. A combination including an architectural component adapted to be inserted into an opening formed in an exterior wall of thin-walled metal or plastic siding, comprising:

an exterior wall of thin-walled siding, said siding having an opening formed therein, edges of said siding being defined at the inner periphery of said opening;

a one-piece, vacuum-formed plastic frame portion forming a complete perimeter for the component, said frame portion including a back side adapted to face inward toward the interior of the building and a front side adapted to be exposed to view from the exterior of the building, said frame portion including a laterally outwardly projecting nailing flange on said back side, and said frame portion further including an undercut portion surrounding the complete perimeter of said frame portion, said undercut portion being located between said nailing flange and said front side and being recessed laterally inwardly from the laterally outer edges of both said nailing flange and said front side, thereby to form a peripheral pocket into which the siding edges which define the exterior wall opening can be received, said edges being essentially concealed from view by said front side of said frame portion; and

said exterior wall having an upper and a lower portion, said frame portion having a plurality of louvers extending thereacross, said louvers being parallel to each other.

4,875,318

PLASTIC BUILDING PRODUCT

Richard J. MacLeod, Milford, and Charles E. Schiedegger, Metamora, both of Mich., assignors to Tapco Products Company, Inc., Detroit, Mich.

Filed May 10, 1988, Ser. No. 192,237

Int. Cl.[4] E06B *1/04*

U.S. Cl. 52—211 **21 Claims**

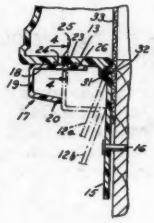
1. A plastic building product for use on walls of a building having an outer and inner surface to provide a louver or opening wherein siding on said outer surface abuts the product comprising

a one-piece plastic body having an integral central portion defining a louver or opening,

an integral continuous peripheral wall circumscribing the louver or opening,

an integral flange extending laterally from the peripheral wall for fastening the body to said outer surface, and

a removable plastic flange member telescoped over the peripheral wall of the body and including a continuous axial wall and an integral laterally extending continuous



flange adapted to overlie portions of abutting siding or the like,

the flange and the peripheral wall including interengaging means for selectively positioning the flange member at predetermined distances with respect to the flange on the body to accommodate siding of varying thicknesses,

said interengaging means being provided at circumferentially spaced positions along said continuous peripheral wall and continuous flange.

4,875,319

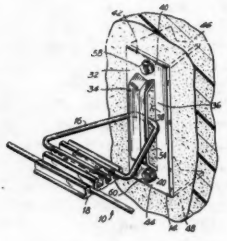
SEISMIC CONSTRUCTION SYSTEM

Ronald P. Hohmann, Syosset, N.Y., assignor to Hohmann & Barnard, Inc., Hauppauge, N.Y.

Filed Jun. 13, 1988, Ser. No. 205,673

Int. Cl.[4] E04B *1/16*

U.S. Cl. 52—383 **43 Claims**



1. A seismic construction system comprising a plurality of support members secured with respect to each other and forming the frame of an edifice,

at least one barrier layer means disposed in abutting engagement with the outer surface portion of selected ones of said support members,

at least one veneer anchor member disposed in proximate relationship with the front surface of said barrier layer means,

said veneer anchor member comprising a plate member, a projecting bar member, and end members,

means for fixedly securing said projecting bar member to said plate member in a manner to form a slot therebetween,

a wall tie member having a first end portion and a second

end portion, said first end portion being positionally disposed in the slot between said plate member and said projecting bar member of said veneer anchor member,

a clip member comprising, a base member, said base member including

first and second attachment means formed thereon,

said second end portion of said wall tie member being secured to said first attachment means of said clip member,

wire reinforcing means secured to said second attachment means of said clip member,

an outer wythe assembly, and said second end portion of said wall tie member, said clip member, and said wall reinforcing means being positionally securable along the longitudinal dimension of said outer wythe assembly, to thereby secure said wall tie member and said wire reinforcement means with respect to said outer wythe assembly.

4,875,320

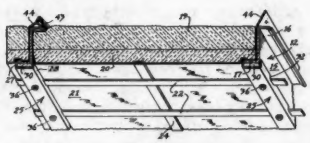
ROOF INSULATION SUPPORT SYSTEM

Julian G. Sparkes, P.O. Box 1293, Lebanon, Tenn. 37087

Filed May 26, 1988, Ser. No. 199,017

Int. Cl.[4] E04B 1/74

U.S. Cl. 52—406 **6 Claims**



1. In an insulated roof support structure having a plurality of elongated, parallel, transversely spaced purlins, each purlin having a vertical web and an elongated horizontal bottom flange, and insulation layer material occupying the spaces between said webs, an insulation support system comprising:

(a) an elongated channel-shaped support bar including a bottom wall having a width substantially equal to the width of the bottom flange of each purlin, and a pair of opposed upward projecting side walls,

(b) an elongated insulation strip of a width substantially equal to the width of said bottom flange of each purlin received coextensively within said channel-shaped support bar,

(c) a plurality of transverse support straps, each transverse support strap extending transversely beneath said purlin bottom flange and above said insulation strip,

(d) fastener means securing said support bar, said insulation strip, said transverse strap and said bottom flange together, so that said support bar extends co-extensively with said bottom flange, and said support bar and said insulation strip clamp and hold said transverse support strap against the bottom surface of said bottom flange,

(e) a plurality of longitudinal support straps, each said longitudinal support strap extending longitudinally substantially midway between a pair of adjacent purlins, and

(f) said longitudinal support straps and said transverse support straps supporting said insulation layer material between said purlins.

4,875,321

ROOFING SHINGLES

Nicholas J. Rohner, Delhi, N.Y. 13753

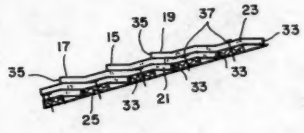
Filed Sep. 2, 1988, Ser. No. 239,941

Int. Cl.[4] E04D 1/28

U.S. Cl. 52—553 **7 Claims**

1. A pair of coordinated roofing shingles for use in covering a roof by placing a series of rows of overlapping shingles on the roof, said pair of coordinated roofing shingles comprising:

a full-size shingle including a flat sheet of weather-resistant material having a front side exposed to the weather and a rear side which is placed against the roof and having a rectangular shape with two minor edges and two major edges, the major edges of the full-size shingle being approximately three times the length of the minor edges, said full-size shingle further including a backing strip of weather-resistant material substantially of rectangular shape and having a thickness substantially equal to the thickness of the flat sheet of weather-resistant material and being affixed to the rear side of the full-size shingle and being located substantially parallel to the two major edges, and substantially equally-spaced between the two minor edges with a length less than the length of the two major edges; and



a half-size shingle including a flat sheet of weather-resistant material having a front side exposed to the weather and a rear side which is placed against the roof, and having a rectangular shape with two minor edges and two major edges, the major edges of the half-size shingle being approximately one and one-half times the length of the minor edges of the full-size shingle, the minor edges of both the half-size shingle and the full-size shingle being substantially the same, said half-size shingle further including a backing strip substantially of rectangular shape and having a thickness substantially equal to the thickness of the flat sheet of weather-resistant material and being affixed to the rear side of the flat sheet of weather-resistant material and being located parallel to the two major edges and extending substantially the entire length of the major edges between the two minor edges.

4,875,322

PROCESS FOR THE INSULATION OF EXISTING BUILDING FACADES AND PREFABRICATED PANEL TO BE USED IN APPLYING SAID PROCESS

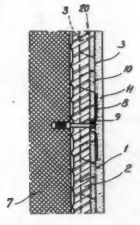
Costantino Rozzi, Ascoli Piceno, Italy, assignor to R.E.IN. S.p.A., Italy

Filed Nov. 20, 1987, Ser. No. 123,173

Claims priority, application Italy, Dec. 12, 1986, 22672 A/86

Int. Cl.[4] E04B 1/38

U.S. Cl. 52—746 **5 Claims**



1. Process for the insulation of existing building facades comprising the steps of covering the facade with flat prefabricated panels consisting of a three-dimensional metal grating partially embedded in a layer of foamed plastic material and placing a surface layer of said foamed plastic material, said

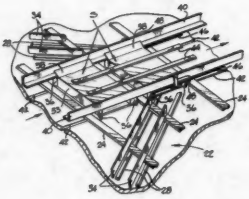
surface layer covering and extending beyond a corresponding face of said grating, next to the facade, fixing said prefabricated panels to said facade, and completion of the coating with plastic of a thickness such as to incorporate and cover externally said metal grating.

4,875,323

PACKAGING MACHINE JAMMING DETECTOR

Jimmy R. Craighead, West Monroe, La., assignor to Manville Corporation, Denver, Colo.

Filed Feb. 9, 1988, Ser. No. 154,669
Int. Cl.[4] B65B *21/08, 57/16*
U.S. Cl. 53—48 18 Claims



1. In a machine for packaging articles in a sleeve-type carrier;

means for moving open-ended carrier sleeves downstream of the machine;

article loading means comprising means for moving a plurality of articles into each carrier sleeve through the opposite open ends thereof; and

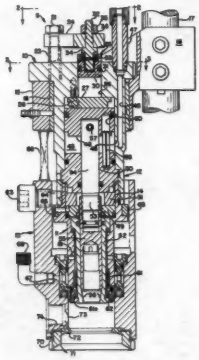
means separate and downstream from said article loading means actuated by articles being forced outwardly through an open end of a carrier sleeve for automatically detecting an article jam inside the carrier sleeve and stopping the operation of the machine.

4,875,324

LOW PRESSURE CAP LIFT WITH HYDRAULIC RETURN

Donald E. Cohrs, Davenport, Iowa, assignor to The Kartridg Pak Co., Davenport, Iowa

Filed Nov. 3, 1988, Ser. No. 266,507
Int. Cl.[4] B65B *31/06, 31/02, 3/10*
U.S. Cl. 53—88 21 Claims



1. In a crimper head for use in introducing fluid under pressure into the mouth of an open container provided with an unsecured closure and thereafter crimping the closure to said mouth comprising, an upper cylinder closed at its upper and lower ends and having flange means which can rest on a support sleeve in which it is vertically reciprocal, a piston operable in said upper cylinder, a lower cylinder attached to said lower end of said upper cylinder and depending co-axially therefrom, a hollow collet co-axially mounted in said lower cylinder, plunger means attached at its upper end to said piston and extending downwardly through a bore in said lower end of said upper cylinder and into said collet for distending the bottom end of said collet, a container-engaging bell surrounding said lower cylinder and the lower end of said upper cylinder and reciprocal with respect to said lower cylinder and said lower end of said upper cylinder, said bell and said lower cylinder having cooperating transverse vacuum-transmitting passageways arranged to register only when said bell occupies a particular vertical position relative to said lower cylinder to thereby establish vacuum communication through said bell and said lower cylinder into an annular clearance region that encircles said collet internally of said lower cylinder and which region opens downwardly into the lower end of said bell for communication with said container, said bell having a second passageway for admitting fluid under pressure into the lower portion of said bell and into a said container engaged by said bell, said upper cylinder having a passageway communicating from its exterior into its interior at a location above said piston and a second passageway communicating from its exterior into its interior below said piston, and all the above-mentioned elements of said head except said bell being collectively vertically reciprocal as a unit between raised and lower positions with respect to said bell when the latter stationarily engages a said container and being collectively lifted with respect to said container-engaging bell and said support sleeve when fluid under sufficient pressure is admitted into said bell through said second passageway, and means for lowering said collectively lifted elements of said crimper head as a unit against the upward lifting force of pressurized fluid retained in the lower portion of said bell comprising, cylinder means carried by said closed upper end of said upper cylinder, fixed piston means operable within said cylinder means, and means fixedly supporting said fixed piston means from said support sleeve at an elevation whereby a closed space forms within said cylinder means under said fixed piston means when said collectively liftable elements are in their said lowered position, said closed space being appreciably reduced when said collectively liftable elements are in their said lifted positions, said cylinder means having passageway means whereby fluid under pressure may be admitted to said reduced space to lower said cylinders means and said collectively lifted elements to an elevation wherein said collect has crimping engagement with a said closure seated on said container mouth.

4,875,325

DEVICE FOR TRANSFERRING AND APPLYING SEALING BANDS

Antonio Gamberini, Bologna, and Marco Brizzi, Zola Predosa, both of Italy, assignors to G.D. Societa per Azioni, Bologna, Italy

Filed Apr. 19, 1988, Ser. No. 183,656
Claims priority, application Italy, May 8, 1987, 3468 A/87
Int. Cl.[4] B65B *41/06, 11/08, 41/16*
U.S. Cl. 53—137 6 Claims

1. A device for transferring and applying elongated sealing bands to a line feeding substantially parallelepiped packets, comprising:

means for guiding and feeding said bands in the direction of their longitudinal dimension,

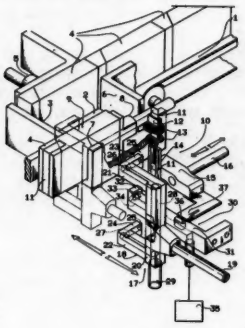
a pocket receiving said bands at the exit end of said guide and feed means,

a withdrawal element for said bands which is arranged to engage each longitudinal end of each said band within said pocket for withdrawal of said band from said pocket,

drive means arranged to impart to said withdrawal element

and to said pocket a movement of mutual retreat and approach,

means for transferring said withdrawal element to a position of application of said bands which is located on the line feeding said packets, and



an auxiliary withdrawal element for engaging, inside said pocket, said band between said longitudinal ends at the same time said withdrawal element engages the two ends of said band to assist in the withdrawal of said band from said pocket.

4,875,326

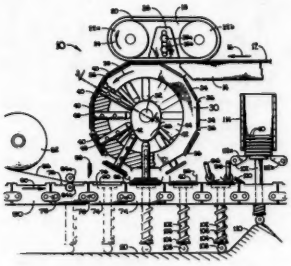
SOFT CHEWING GUM WRAPPING MACHINE AND METHOD

Anthony P. Piano, Sparta, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 17, 1988, Ser. No. 169,521

Int. Cl.[4] B65B *11/00, 35/28, 47/04*

U.S. Cl. 53—435 **14 Claims**



14. A method for wrapping soft chewing gum comprising the steps of:

(a) Cutting said gum into relatively thin rectangular shaped pieces having opposite flat sides with edges therebetween;

(b) Transporting said gum to a wrapping position;

(c) Positioning a wrapper over a nest having a flat bottom;

(d) Urging said shaped piece into said nest at said wrapping position with one of said flat sides placed against said flat bottom to locate a portion of said wrapper therebetween;

(e) Folding said wrapper around said shaped piece of gum; and

(f) Wherein said shaped pieces are transported to a wrapping position one at a time and wherein the transporting means and said nests move within the same vertical plane.

4,875,327

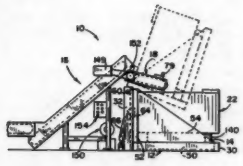
CONTAINER FILLING APPARATUS AND METHOD

Daniel R. Wilde, Sparta, Mich., assignor to Applied Material Handling, Inc., Bailey, Mich.

Filed Nov. 29, 1988, Ser. No. 277,642

Int. Cl.[4] B65B *5/10, 39/14, 57/12, 43/42*

U.S. Cl. 53—475 **30 Claims**



24. A method of filling a container with product, comprising:

providing a parts container;

providing a parts conveyor with a discharge end;

first raising said parts container and lowering said discharge end;

conveying parts from said parts conveyor to said parts container;

second lowering said parts container while substantially maintaining the height of said discharge end, and continuing conveying parts from said parts conveyor to said parts container;

third lowering said parts container while raising said discharge end, and continuing conveying parts from said parts conveyor to said parts container.

4,875,328

PACKAGING MACHINE FOR MULTI-SHEET COMPRESSIBLE PAPER PRODUCTS, SUCH AS PAPER TOWELS, TOLIET PAPER ROLLS AND THE LIKE

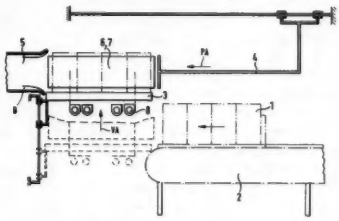
Dieter Meyer, Ludwigshafen, Fed. Rep. of Germany, assignor to Paper Converting Machine GmbH, Schifferstadt, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,038

Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716147

Int. Cl.[4] B65B *1/24, 13/20, 39/06, 63/02*

U.S. Cl. 53—529 **20 Claims**



1. Packaging machine for packaging a plurality of compressible products (1) such as multisheet paper products, for example kitchen towel rolls, toilet paper, in a foil bag (B) having

an essentially vertically reciprocable platform movable between a lower and an upper position;

transport means (2) loading a group of products on the platform when the platform is at the lower position;

insertion means (4) inserting the products into the bag (B) when the platform is in an upper position by pushing the products into the bag,

comprising means for laterally compressing the products prior to being introduced into the bag including

laterally movable side walls (6, 7)located adjacent the reciprocable platform;

means (*6a, 7a,a 6b, 7b,* 9, 10) for moving said side walls towards said products on the platform during raising movement of the platform from the lower to the upper position, thereby laterally compressing the compressible products on the platform simultaneously with raising of said products located on the platform; and

means (9, 10, 38; 11, 12) coupled to the side walls for adjusting the position of the side walls with respect to said products during said raising movement and to determine the final position of the side walls with respect to the products at the end of the raising movement with respect to at least one of: spacing of said side walls; angle of inclination of the side walls.

4,875,329

WRAPPING MACHINE, PARTICULARLY FOR BLISTER PACKS AND THE LIKE, WITH SYNCHRONIZED PLURAL DRIVING MEANS

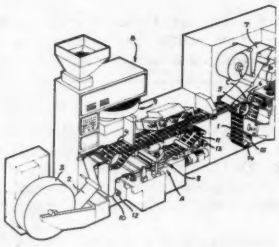
Carlo A. Miselli, Castel San Pietro Terme, Italy, assignor to I.M.A. - Industrie Macchine Automatiche S.p.A., Ozzano Emilia, Italy

Filed Nov. 2, 1987, Ser. No. 116,485

Claims priority, application Italy, Dec. 29, 1986, 3625 A/86

Int. Cl.[4] B65B *11/50, 57/00*

U.S. Cl. 53—559 **5 Claims**



1. A machine for producing and packaging blister packs, comprising:

means defining a transport path and having a first motor operatively connected for intermittent operations along an upstream segment of said path and a second motor operatively connected for continuous operations along a downstream segment of said path;

stamping means along said upstream segment for stamping blisters from a continuous thermoplastic strip intermittently advance by drive of said first motor along said path;

a station for feeding products to be packed into said blisters at a location downstream of said stamping means along said upstream segment;

sealing means for applying a closure strip to said thermoplastic strip at a location downstream of said station along said path to seal said blisters and form a continuous strip of blister packs from said closure and thermoplastic strips;

separating means downstream of said sealing means along said path driven by said second motor for separating said blister packs from said continuous strip of blister packs at a location along said downstream segment;

packaging means downstream of said separating means along said downstream segment of said path for packaging said blister packs in containers;

a device operatively connected to said second motor for establishing a desired speed of said second motor, whereby said second motor constitutes a leader motor;

a respective encoder connected to each of said motors generating respective incremental pulses representing rotation of the respective motors;

a converter connected to receive the respective pulses of the encoder connected to said second motor for converting a frequency of the received pulses into an analog signal proportional to a speed of the leader motor;

a comparator connected to receive the pulses from both of said encoders, said converter and said comparator having outputs; and

a driver connected to said first motor for energizing same so as to constitute said first motor as a follower motor, said outputs being connected to said driver to synchronize said follower motor with said leader motor.

4,875,330

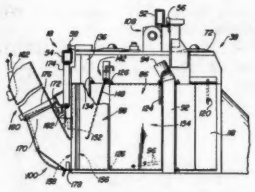
ALIGNABLE COTTON CONVEYING STRUCTURE FOR A TRANSVERSELY MOVABLE ROW UNIT

Timothy A. Deutsch, Newton; Joel M. Schreiner, and Steve H. McBee, both of Ankeny, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 29, 1988, Ser. No. 175,809

Int. Cl.[4] A01D *46/16*

U.S. Cl. 56—41 **19 Claims**

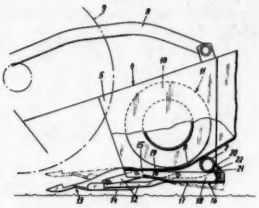


1. In a cotton harvester having a frame supported on ground wheels for forward movement over a field with parallel rows of cotton plants, a cotton basket, a row unit support structure mounted at the forward end of the frame, a plurality of row harvesting units including spindle means for removing cotton from the plants and doffer means for doffing the cotton from the spindles, means for supporting the row harvesting units on the support structure including means for moving at least one of the row units transversely from a rowharvesting position to an access position for providing access to the row units for servicing, conveying structure for receiving cotton from the row units and directing the cotton to the basket, said conveying structure including a first conveying portion having an outlet, and means connecting the first conveying portion to said at least one of the row units for movement transversely therewith, a second conveying portion located downstream of the first conveying portion and supported independently of the first conveying portion, the first conveying portion moving out of cotton conveying relationship with respect to the second conveying portion as the row unit is moved to the access position, said second conveying portion including an inlet adapted for moving into cotton conveying relationship with the outlet of the first conveying portion when the row unit is moved from the access position to the row-harvesting position.

4,875,331
PRODUCT RECEIVING ARRANGEMENT FOR AGRICULTURAL MACHINES, ESPECIALLY FOR SELF-PROPELLING HARVESTER THRESHERS

Heinrich Ostrup, and Josef Hegger, both of Harsewinkel, Fed. Rep. of Germany, assignors to CLAAS OHG, Fed. Rep. of Germany

Filed Jun. 30, 1988, Ser. No. 213,614
Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 3722143
Int. Cl.[4] A01D *34/04*
U.S. Cl. 56—208 **10 Claims**

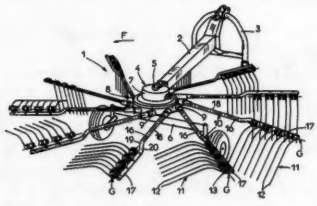


1. A liftable and lowerable product receiving arrangement for agricultural machines, especially for self-propelling harvester threshers, comprising a cutting mechanism platform having a front end; a flexible cutting bar mounted pivotally on said front end of said cutting mechanism platform and extending substantially in a horizontal plane; sliding skids arranged to support said cutting bar in a height-displaceable manner relative to said cutting mechanism platform; and supporting skids connected to said cutting mechanism platform and arranged behind said flexible cutting bar as considered in a transporting direction and at least in its both lateral end regions, said supporting skids having lower limits extending at most at a height of one of said cutter bar and said sliding skids, said supporting skids being separate from and independent of said sliding skids.

4,875,332
HAY MAKING MACHINE

Jerome Aron, Bouxwiller, France, assignor to Kuhn, S.A., Saverne Cedex, France

Filed Mar. 30, 1988, Ser. No. 175,222
Claims priority, application France, Apr. 1, 1987, 87 04672
Int. Cl.[4] A01D *78/12*
U.S. Cl. 56—377 **7 Claims**



1. A hay making machine comprising a beam carrying at least one raker wheel having:

(a) a central causing comprising a stationary upper part and a mobile lower part;

(b) a plurality of tool-carrying arms projecting from said mobile part in an at least approximately horizontal array, each one of said plurality of tool-carrying arms comprising an inside part having a longitudinal axis of rotation and an outside part; and

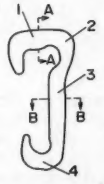
(c) at least one work tool mounted on said outside part of each one of said plurality of tool-carrying arms,

(d) wherein said outside part of each one of said plurality of tool-carrying arms is offset in relation to the longitudinal axis of rotation of the corresponding inside part of said each one of said plurality of tool-carrying arms towards the side opposite the one on which said work tools are located, so that the center of gravity of each set comprising one of said outside parts and the associated at least one work tool is located at least approximately on the longitudinal axis of rotation of the inside part of said each one of said plurality of tool-carrying arms.

4,875,333
PLASTIC TRAVELLER FOR RING SPINNING MACHINERY

Yuzuru Nakano, Takarazuka, Japan, assignor to Kanai Juyo Hyogo, Kogyo Company Limited, Hyogo, Japan

Filed Oct. 27, 1988, Ser. No. 263,248
Claims priority, application Japan, Nov. 6, 1987, 62-281396
Int. Cl.[4] D01H *7/60*
U.S. Cl. 57—125 **5 Claims**



1. A resin traveller for spinning machinery made mainly of nylon 4-6, having a crystalline structure of 0.5–4 μm in the size of spherulites and 35–55% (DSC method) in the degree of crystallinity, and having a thermal deformation temperature of 200°–285° C. under a load of 18.6 kg/cm^2.

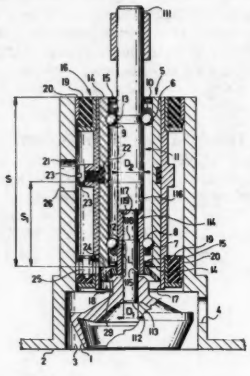
4,875,334
SPINDLE CONSTRUCTION FOR MOUNTING ARRANGEMENTS FOR SPINNING MACHINE ROTORS

Zdenek Rajsigl, and Frantisek Kriz, both of Brno, Czechoslovakia, assignors to Zavody na vyrobu lozisk, Povazska Bystrica, Brno, Czechoslovakia

Filed Nov. 17, 1988, Ser. No. 272,277
Claims priority, application Czechoslovakia, Nov. 19, 1987, PV8316-87
Int. Cl.[4] D01H *7/882, 7/10*; F16C *19/08, 33/80*
U.S. Cl. 57—406 **10 Claims**

1. A spindle, particularly for a mounting arrangement of spinning rotor within the spinning housing of a spinning machine, said spindle comprising an outer sleeve with races for two ball rows arranged in cages, a shaft provided with races and having an external end portion adapted to be driven by driving means and an internal end portion adapted for the mounting arrangement of the spinning rotor as well as a seal for sealing the annular gap, a plurality of balls arranged between the outer sleeve and the shaft, the shaft comprising a dynamically elastic portion and a supporting sleeve including an internal recess, said spindle further comprising an intermediate sleeve for fixing the outer sleeve and including an internal wall having a cylindrical orifice therein, a plurality of resilient damping elements with an outer supporting sleeve adapted for mounting within the spinning housing, a labyrinth seal disposed in the space between the spinning rotor and the front side of the outer sleeve, said labyrinth seal including a labyrinth knife separating the rotor space within the spinning housing from a compensation space between the labyrinth seal and the front side of the outer sleeve, interconnected through an

air-aspiration orifice with a space external of the spinning housing, said shaft, including said dynamically elastic portion and said supporting sleeve including said internal recess, also comprising a fastening surface defining a cylindrical bore, and at least one said race for an inner row of said balls, said supporting sleeve constituting at least a part of a dynamically rigid



portion of the shaft, the dynamically elastic portion of the shaft being limited by the length thereof between the beginning of the hub of the spinning rotor and a transition area between the internal recess of the supporting sleeve and fastening surface at which the dynamically rigid portion begins, and said transition area is provided in the first half of the length of the outer sleeve laterally adjacent to said inner ball row.

4,875,335

APPARATUS AND METHOD FOR TREATING AN EXHAUST GAS FROM A DIESEL ENGINE

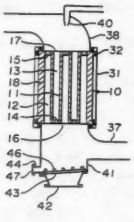
Yoshimasa Arai, Chiba; Satoshi Enamito, Tokyo, and Noriyuki Oda, Chiba, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 247,929

Claims priority, application Japan, Sep. 25, 1987, 62-238913

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—274 **20 Claims**



1. In an apparatus for treating an exhaust gas from a diesel engine, including a filter unit in an exhaust gas passage for the diesel engine, the filter unit having a honeycomb structure wherein a plurality of cells are divided by cell walls having a filtration function and extend in the same direction as one another, predetermined cells being closed at one end, and the remaining cells being closed at the other end; the improvement comprising:

back washing gas flow generating means for generating a gas flow at appropriate intervals so as to pass through the cell walls in the direction opposite to the flow of the exhaust gas flow, and

a recollecting unit for particulates, which is provided in the exhaust gas passage at a position upstream to the filter unit.

4,875,336

EXHAUST GAS EMISSION CONTROL DEVICE FOR DIESEL ENGINE

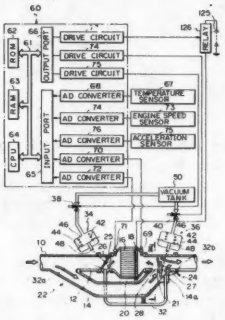
Kotaro Hayashi, Susono; Sumio Ito, Gotenba, and Kiyoshi Kobashi, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Dec. 28, 1988, Ser. No. 291,274

Claims priority, application Japan, Jan. 12, 1988, 63-001708; Mar. 18, 1988, 63-063655

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—286 **15 Claims**



1. An exhaust gas emission control device for a Diesel engine having an exhaust passage for discharging exhaust gas to the atmosphere, said device comprising:

a filter provided in the exhaust passage for trapping particles in the exhaust gas;

heater means provided near said filter to ignite particles accumulated on said filter when regenerating said filter;

first passage means connecting a first connecting portion located upstream of said filter to a second connecting portion located downstream of said filter;

second passage means connecting a third connecting portion located upstream of said filter to a fourth connecting portion located downstream of said filter;

a single first valve provided in an upstream portion of said filter;

a single second valve provided in a downstream portion of said filter; and

control means for controlling said first and second valves,

said control means controlling said first and second valves in such a manner that, when it is determined that a regeneration of said filter is not to be carried out, at least one of said first valve and said second valve closes said first and second passage means at at least one of said first and third connecting portion and said second and fourth connecting portion, and said first and second valves open the exhaust passage, whereby exhaust gas flows through said filter and said heater means, and when it is determined that a regeneration of said filter is to be carried out, said first valve closes the exhaust passage between said first connecting portion and said third connecting portion, and said second valve is open to a predetermined degree, so that exhaust gas flows into said first passage means, and a part of the exhaust gas flowing via said first passage means flows through said heater means, said filter, and said second passage means.

4,875,337

CONSTRUCTION MACHINE DUAL-DUMP HYDRAULIC CIRCUIT WITH PILOTED ARM-BOOM CYLINDER SUPPLY PRIORITY SWITCHING VALVES

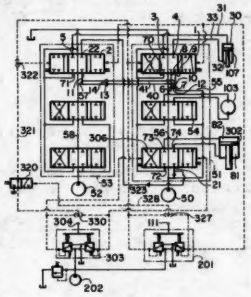
Genroku Sugiyama, Ibaraki; Toichi Hirata, Ushiku, and Shinichi Satoh, Ibaraki, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Sep. 28, 1987, Ser. No. 101,427

Claims priority, application Japan, Sep. 27, 1986, 61-227116

Int. Cl.[4] F15B *13/09, 13/06;* E02F *3/32*

U.S. Cl. 60—421 7 Claims



1. A hydraulic circuit for a construction machine comprising:

an acutator for working machine;

an actuator for working element;

first and second hydraulic pumps;

first and third directional control valves connected to said first hydraulic pump, said first directional control valve controlling an operation of said actuator for working machine and said third directional control valve controlling an operation of said actuator for working element;

a second directional control valve connected to said second hydraulic pump, said second directional control valve including a neutral position at which a communication between said second hydraulic pump and a first output port of said second directional control valve is blocked and a communication between said actuator for working machine and a reservoir is blocked, one changed position at which said communication between said second hydraulic pump and said first output port is allowed and said communication between said actuator for working machine and the reservoir is blocked and another changed position at which said communication between said second hydraulic pump and said first output port is blocked and said communication between said actuator for working machine and the reservoir is allowed;

first pilot operating means for controlling operation of said first and second directional control valves;

second pilot operating means for controlling an operation of said third directional control valve and for shifting said second directional control valve to said one changed position;

first hydraulic fluid joining means for joining hydraulic fluid of said second hydraulic pump with hydraulic fluid of said first hydraulic pump, said first hydraulic joining means connecting said first output port of said second directional control valve to an input side of said third directional control valve;

second hydraulic fluid joining means for joining the hydraulic fluid of said second hydraulic pump with the hydraulic fluid of said first hydraulic pump, said second joining means connecting an input side of said second directional control valve to an input side of said first directional control valve; and

priority control means for, when a signal of said first pilot operating means is issued, preventing a signal of said second pilot operating means from being applied to said second directional control valve, said priority control means including a first passageway for leading the signal of said second pilot operating means to said second directional control valve, a device interposed in said first passageway for closing said first passageway when the signal of said first pilot operating means is received and a second passageway interconnecting between said device and said first pilot operating means to lead to said device the signal of said first pilot operating means to close said first passageway;

whereby said actuator for wording element is actuated by the hydraulic fluid from the first and second hydraulic pumps joined by said first hydraulic fluid joining means when only said second pilot operating means is operated and

said actuator for working machine is actuated by the hydraulic fluid from the first and second hydraulic pumps joined by said second hydraulic fluid joining means when only said first pilot operating means is operated and also when said first and second pilot operating means are operated at the same time.

4,875,338

HYDRAULIC BRAKE BOOSTER ARRANGEMENT WITH PARALLEL MASTER CYLINDERS AND COMMON HOUSING FOR PIVOTABLE ROCKER

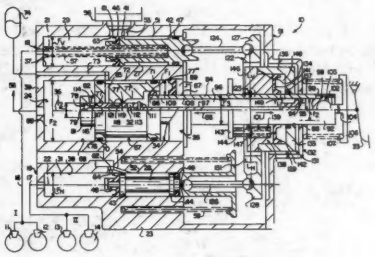
Heinz Leiber, Oberriexingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Dec. 30, 1987, Ser. No. 139,385

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1987, 3700697

Int. Cl.[4] B60T *13/12, 15/02*

U.S. Cl. 60—550 9 Claims



1. Brake unit for controlling the brake pressures in the wheel brakes of a road vehicle equipped with a hydraulic dual-circuit brake system via a hydraulic brake booster, said brake unit including:

two static master cylinders in a common unit housing with a brake-booster brake valve for supplying an outlet pressure proportional to the pedal force from an outlet pressure space to the wheel brakes, each of said master cylinders are assigned to one of the two brake circuits and each have a master piston, the master piston is displaceable in its outlet-pressure space to increase therein in response to an increased pressure caused by actuation of said brake booster valve, an actuating member displaceable as a result of pedal actuation and being supportable on the master piston, wherein in the event of a failure of an auxiliary pressure source of the brake booster, the master pistons are displaceable solely as a result of a control force exerted by the driver via said pedal actuation displacing the actuating member;

a brake booster including a drive piston and cylinder which

can be subjected to a boost pressure in proportion to the outlet pressure of the brake valve and which brake booster piston effects the boosting of the actuating forces taking effect on the master pistons by transmitting to the drive cylinder the boost pressure and by having actuating forces generated by the drive cylinder connected to the master pistons through a rocker which jointly displaces both drive pistons and which is pivotable about an axis perpendicular to a longitudinal axis of the drive cylinder and which has rocker arms which engage the master pistons of the two master cylinders via supporting members in a torque-compensated manner to provide for the displacement thereof;

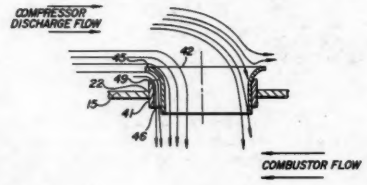
a compensating cylinder which is moved jointly with movement of the drive piston and which is subjected to the outlet pressure of the brake valve, a compensating piston of said compensating cylinder is displaceable relative to the drive piston and has a piston surface larger than a piston surface of the drive piston, and wherein the boost pressure at the drive is connected to the compensating cylinder to apply a force to the compensating piston in a same direction as the force resulting from the subjection of the drive cylinder to pressure by the brake booster valve and which is exerted on the drive piston, relative movements of the compensating piston in relation to the drive piston being limited by a stop connected fixedly to the drive piston, and wherein relative movements of the compensating piston in relation to the drive piston is limited to a distance, within which each master piston of the master cylinders are displaceable out of a basic position where the outlet-pressure spaces communicate with a brake fluid storage tank of the brake system, to another position where the outlet pressure spaces of the master cylinders are shut off relative to the brake fluid storage tank and any further displacement of the master pistons leads tank and any pressure build-up in the outlet pressure spaces connected to the wheel brakes.

4,875,339

COMBUSTION CHAMBER LINER INSERT

Neil S. Rasmussen, Loveland; Li-Chieh Szema, West Chester, both of Ohio, and Nesim Abuaf, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 27, 1987, Ser. No. 126,041
Int. Cl.[4] F23R *3/04*
U.S. Cl. 60—757 **8 Claims**



1. A gas turbine combustion system combustor liner comprising in combination:

(a) a tubular wall combustor liner having a closed end and an opposite open end,

(b) said liner having axially spaced circumferential rows of circular apertures in the tubular wall thereof,

(c) and a film cooled insert in some of said circular apertures in said liner, said insert comprising

(i) a first short cylindrical sleeve member having an O.D. appropriate for insertion in said circular apertures in said liner,

(ii) a second sleeve member having a cylindrical section at its inner end and a coterminous radially outwardly flared section at the other end,

(iii) said second sleeve member being inserted and positioned axially in said first sleeve member in eccentric relationship thereto so that said second sleeve member comes into radial contact with said first sleeve member to define a radially crescent shaped but axially directed flow passage between said first and second sleeve members.

(iv) said radially flared section of said second sleeve member defining an annular lip surrounding said sleeve member with the plane of said lip perpendicular to the longitudinal axis of said second sleeve,

(v) said cylindrical section of said second sleeve member having an O.D. less than the I.D. of said first cylindrical sleeve member, and

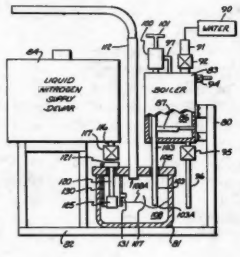
(vi) joining means joining said sleeves to each other at their eccentric contact juncture.

4,875,340

NON-CONTAMINATING FLOW VISUALIZATION SYSTEM

Benjamin Y. H. Liu, North Oaks, and James W. Ramsey, Golden Valley, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation-in-part of Ser. No. 8,871, Jan. 29, 1987, Pat. No. 4,771,608. This application Sep. 19, 1988, Ser. No. 246,354
Int. Cl.[4] F17C *0/2*
U.S. Cl. 62—50.2 **19 Claims**



1. A non-contaminating flow visualization fog generator system for indicating airflow in a room comprising:

means for providing a flow of steam;

a first container holding a liquid cryogen having an exposed surface;

means receiving the flow of steam and discharging the flow of steam at a location in the first container so the steam passes over the cryogen surface and changes to a fog containing water droplets;

means for permitting discharge of the fog from the reservoir containing the cryogen into a room;

a separate supply of liquid cryogen supported adjacent the first container; and

means for controlling flow of the liquid cryogen from the supply to the first container to maintain a desired level of cryogen in the first container.

4,875,341

CONTROL APPARATUS FOR REFRIGERATED CARGO CONTAINER

Michael J. Brandemuehl, Manlius, and John R. Reason, Liverpool, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 125,213, Nov. 25, 1987, Pat. No. 4,789,025. This application Dec. 1, 1988, Ser. No. 278,683
Int. Cl.[4] F25B *41/04*
U.S. Cl. 62—115 **3 Claims**

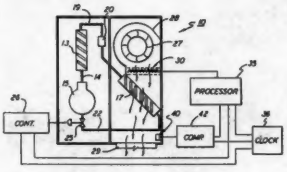
1. A method of controlling the temperature inside a mobile

cargo container that is equipped with a refrigeration unit for supplying chilled air to the container, the method including:

providing an adjustable control valve in a suction line leading to the refrigeration unit compressor, said valve being adjustable in uniform increments between a fully opened and a fully closed position,

periodically sensing the temperature of the supply air being discharged from the refrigeration unit into the container at given intervals,

comparing the sensed temperature to a predetermined set point temperature to determine the amount of deviation between the two temperatures,



fully opening the control valve when the amount of deviation is greater than a first value whereby the supply air temperature is changed at a fast rate,

adjusting the control valve a first number of increments during each sensing interval when the amount of deviation is between said first value and a second lesser value whereby the supply air temperature is changed at an intermediate rate, and

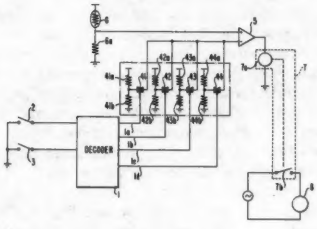
adjusting the control valve a second lesser a number of increments during each sensing interval when the amount of deviation is less than said second value whereby the supply air temperature is changed at a relatively slow rate.

4,875,342

TEMPERATURE CONTROL MEANS FOR A REFRIGERATING APPARATUS

Susumu Ikeda, Moro Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Jun. 15, 1987, Ser. No. 61,475
Claims priority, application Japan, Jun. 14, 1986, 61-90019[U]
Int. Cl.[4] G05D *15/00*
U.S. Cl. 62—115 **6 Claims**



1. A temperature control device for controlling a refrigerating apparatus comprising:

temperature level determining means for determining a plurality of desired temperature levels;

temperature selecting means for selecting one of said plurality of desired temperature levels;

temperature sensing means for sensing the actual temperature;

comparator means for comparing said desired temperature with said sensed temperature to determine if said sensed temperature corresponds to said desired temperature; and

control means for controlling said refrigerating apparatus in accordance with an output of said comparator means;

wherein said temperature selecting means comprises:

a plurality of temperature determining switch means for determining a desired temperature level;

decoder means for decoding the state of said temperature determining switches;

a plurality of analog switches, each of said analog switches being connected between said decoder and said comparator;

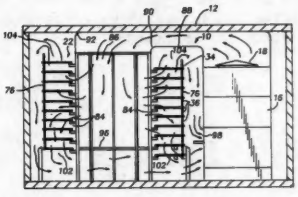
wherein one of said analog switches is energized in accordance with an output of said decoder means to enable a representation of a desired temperature level to be provided to said comparator means.

4,875,343

CLIMATE CHAMBER WITH CONVEYOR

E. Hakan O. Jeppsson, 942 Albera Dr., Wooster, Ohio 44691

Filed Mar. 14, 1988, Ser. No. 168,135
Int. Cl.[4] F25D *25/02*
U.S. Cl. 62—381 **17 Claims**



7. Apparatus for conveying products to be treated in a heat transfer chamber, comprising:

an endless conveyor belt including a generally horizontal product-supporting weblike bed with a pair of opposed lateral edges and a substantially vertical sidewall on one edge, said conveyor belt being coiled in a generally helical configuration to form a plurality of helical tiers stacked one above the other with the sidewall portion of a lower tier contacting the sidewall portion of an adjacent upper tier to support at least a portion of the weight thereof; and

a generally helical guide rail contacting the other lateral edge of said conveyor belt to support at least a portion of the weight thereof and to space said other lateral edges vertically apart from one another a distance substantially equal to the height of said sidewall portions.

4,875,344

CHILLER

David R. Zittel, Columbus, Wis., assignor to Lyco Manufacturing, Inc., Columbus, Wis.

Filed Jan. 17, 1989, Ser. No. 297,703
Int. Cl.[4] F25D *25/02*
U.S. Cl. 62—381 **14 Claims**

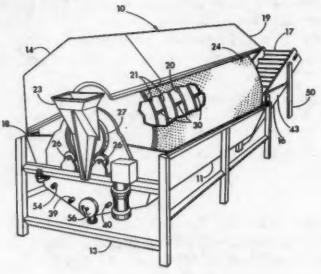
1. A chiller comprising:

(a) a tank which includes an inlet end and a discharge end;

(b) a perforate cylinder mounted rotatably within the tank so that water contained in the tank will enter the cylinder, the cylinder having an inlet opening near the inlet end of the tank for receiving introduced food product and an outlet opening near the discharge end of the tank where food product which has moved through the cylinder can be discharged therefrom;

(c) an auger positioned substantially within the perforate cylinder to rotate with the cylinder, the auger having flights of diameter about equal to that of the cylinder which drive the food product toward the cylinder outlet opening; and

(d) a plurality of lifting baffles, each of which extends substantially radially inwardly from the perforate cylinder and between two adjacent flights of the auger, so that



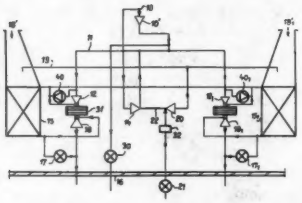
when the auger and cylinder rotate, the baffles carry the food product sidewardly and lift the food product upwardly out of the water, and then allow the food product to tumble back into the water.

4,875,345

HIGH-PERFORMANCE AIR-CONDITIONING INSTALLATION FOR AIRCRAFT

Jacques Signoret, Toulouse, France, assignor to ABG Semca, Toulouse, France

Filed Jan. 15, 1988, Ser. No. 144,155
Claims priority, application France, Jan. 16, 1987, 87 00453
Int. Cl.[4] F25D 9/00
U.S. Cl. 62—402 **11 Claims**



1. An air conditioning installation for an aircraft including:

expansion turbine means coupled to a passenger cabin exhaust and from said passenger cabin of said aircraft for producing air at a temperature lower than air external to said aircraft,

cooling means for cooling air to be introduced into said passenger cabin, said cooling means including a heat exchanger cooled by air external to said aircraft, and

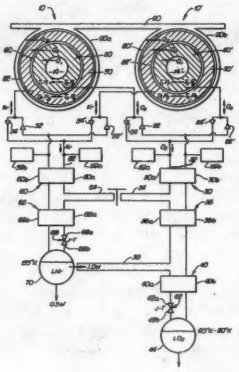
means for mixing said air produced by said expansion turbine means with said external air supplied to said heat exchanger.

4,875,346

TWO-STATGE SORPTION TYPE CRYOGENIC REFRIGERATOR INCLUDING HEAT REGENERATION SYSTEM

Jack A. Jones, Los Angeles; Liang-Chi Wen, La Canada, and Steven Bard, Northridge, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 31, 1989, Ser. No. 304,149
Int. Cl.[4] F25B 1/00
U.S. Cl. 62—467 **19 Claims**



1. A two-stage sorption cryogenic refrigeration system adapted for use with a first refrigerant and a second refrigerant comprising:

(a) a first container comprising:

(1) a first pressurization chamber and a second pressurization chamber, the first pressurization chamber being disposed within the second pressurization chamber and the first pressurization chamber containing a first sorbent material for sorbing the first refrigerant, the second pressurization chamber containing a second sorbent material for sorbing the second refrigerant;

(2) means for heating the first pressurization chamber to thereby desorb the first refrigerant thereby generating a high pressure flow thereof;

(3) means for thermally coupling the first and second pressurization chambers; wherein heat from the first pressurization chamber heats the second pressurization chamber to thereby desorb the second refrigerant thereby generating a high pressure flow thereof;

(4) means for cooling the second pressurization chamber.

(b) first expansion means coupled to the first pressurization chamber for expanding the high pressure flow of the first refrigerant generated by the first pressurization chamber; and

(c) second expansion means coupled to the second pressurization chamber for expanding the high pressure flow of the second refrigerant generated by the second pressurization chamber to provide precooling of the first refrigerant.

4,875,347

METHOD OF ACTUATION OF NEEDLE SELECTION LATCHES OF A KNITTING MACHINE, AND A DEVICE FOR PERFORMING THE METHOD

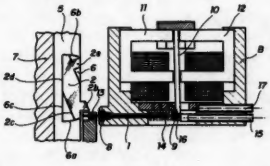
Jacque Vermot-Gaud, Perly, Switzerland; Rémi Cottenceau, Viry, France, and Erwin Zaercher, Le Lignon, Switzerland, assignors to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH, Albstadt, Fed. Rep. of Germany

Filed Dec. 1, 1988, Ser. No. 278,339

Claims priority, application Switzerland, Dec. 4, 1987, 4745/87

Int. Cl.[4] D04B 9/10

U.S. Cl. 66—219 14 Claims



1. A method of actuating needle selection latches in a knitting machine, said latches being movable between two end positions, comprising the steps of:

applying an elastic impact to a surface of a latch to be selected thereby moving said latch from a said end position into engagement with a cam,

and effecting relative movement of said cam and latch thereby moving said latch into the other said end positions.

4,875,348

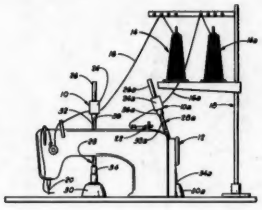
THREAD DYEING APPARATUS AND METHOD

Earl Kinnebrew, II, and Paul D. Palmer, Sr., both of Edmond, Okla., assignors to Rhema Enterprises, Inc., Edmond, Okla.

Continuation-in-part of Ser. No. 55,413, May 27, 1987. This application Apr. 19, 1988, Ser. No. 183,687

Int. Cl.[4] D06B 1/12

U.S. Cl. 68—200 10 Claims



1. A dye applying apparatus for applying a dyeing liquid to a thread, comprising:

a marker comprising a marker container having an upper end and a lower end with a marker opening extending a distance therethrough intersecting the lower end thereof, a transorb material being disposed within the marker opening and a nib with a portion of the nib being disposed in the transorb material and the nib extending a distance out from the open end of the marker container terminating with a tip end, dyeing liquid being disposed in the marker opening and being transferred through the transorb material to the nib, a slit being formed in the tip end of the nib with a slit extending a distance through the nib, the slit being sized to accommodate a portion of the thread extending through the slit with portions of the nib formed by the slit being disposed generally adjacent the portions of the thread extending through the slit, the dye liquid being applied to the thread via the nib;

a support housing having a thread opening extending through a portion thereof, the thread opening being sized for receiving a thread so that the thread is movable therethrough, the support housing having a housing opening extending a distance through the support housing with a portion of the housing opening intersecting the thread opening, and wherein a portion of the marker is defined further as being supportable in the housing opening so nib is disposed within the housing opening, the thread being disposed in the slit in the nib as the thread is moved through the thread opening for applying dye to the thread; and

a support stand having opposite ends with one end being adapted to be removably connectable to the support housing for supporting the support housing.

4,875,349

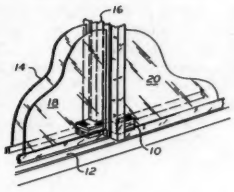
DEVICE FOR LOCKING DOUBLE SLIDING DOORS

Mario D. Girard, 2959, Mandeville,, Longueuil, Quebec, Canada (J4L/4G8)

Filed Aug. 11, 1988, Ser. No. 230,914

Int. Cl.[4] E05B 65/08

U.S. Cl. 70—95 9 Claims



1. A device for locking adjacent sliding doors of double sliding doors in their closed position, each adjacent sliding door being provided with a jamb spaced from each other by a distance (E), said jambs overlapping over a length (F) to define a double check space when said adjacent doors are closed; said device comprising a set of at least two superposed and separable plates, each plate having a thickness smaller than said distance (E) to allow each plate to be individually slid edgewise and subsequently disposed flatwise, each of said plates having a shank portion and a pair of opposite tongue portions orthogonally extending sideways in opposite directions at each end of the shank and substantially corresponding to said double check space, whereby one of said tongues has a contoured surface adapted to abut against one of said jambs and the other of said tongues has a contoured surface adapted to abut against the other of said jambs to prevent the sliding of said adjacent doors, and locking means adapted to extend through said plates while superposed and disposed flatwise for preventing the edgewise rotation of said plates.

4,875,350

PUSH LOCK ACTUABLE ANTI-THEFT VEHICLE DEVICE

James H. Faust, Hoffman Estates, Ill., assignor to ABC Auto Alarms, Inc., Elk Grove Village, Ill.

Filed Aug. 4, 1988, Ser. No. 228,336

Int. Cl.[4] B60R 25/04; E05B 65/19

U.S. Cl. 70—241 12 Claims

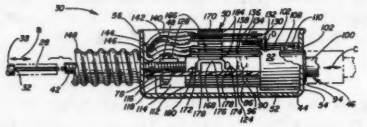
1. A push lock actuable anti-theft vehicle device for a vehicle having a hood comprising:

coupling means for coupling the hood to said vehicle secured within an engine compartment of the vehicle and

having a first locked position and a second unlocked position;

a cable secured at one end to said coupling means, said cable being manipulable to lock and unlock said coupling means;

push lock means for manipulating said cable to lock and unlock said coupling means coupled to the other end of said cable, said push lock means being manually operable between a first position wherein said cable is manipulated to lock said coupling means and wherein said push lock means are keyed and are operable by a key to a second position wherein said cable is manipulated to unlock said coupling means, said push lock means including an engagement member having at least two operating positions provided by movement of said push lock means between said first and second positions; and



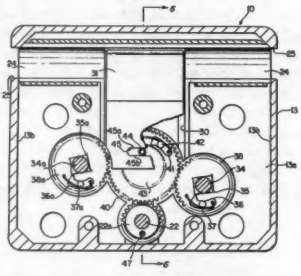
electrical contact means for opening and closing at least two desired electrical circuits, said contact means being in communication with said engagement member of said push lock means to operate said electrical contact means upon movement of said push lock means between said first and second positions so that when said engagement member is positioned in one of said at least two operating positions it opens a first of said at least two circuits and closes a second of said circuits and when said engagement member is positioned in the other operating position it closes said first circuit and opens said second circuit.

4,875,351

ELECTRONIC TIME LOCK

Walter R. Evans, Lancaster; Joseph M. Remenicky, Nicholasville; Thomas E. Jasper, Bryantsville, and Wayne W. Ballard, Nicholasville, all of Ky., assignors to Sargent & Greenleaf, Inc., Nicholasville, Ky.

Filed Aug. 19, 1988, Ser. No. 234,562
Int. Cl.[4] E05B *43/00*
U.S. Cl. 70—271 **16 Claims**



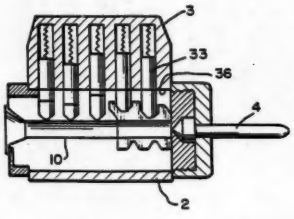
1. An electronic time lock for bank vault doors and the like having a door bolting mechanism including a snubber bar, the time lock comprising a lock case in the form of a generally rectangular box having parallel vertical front and rear walls; in a use position and enclosing side, top and bottom walls defining a mechanism chamber, an intermediate vertical partition located in said chamber between said front and rear walls, said rear wall and intermediate partition having means defining cylindrical guide bores for reciprocating movement of the snubber bar therein and said side walls having holes aligned therewith for receiving the snubber bar therethrough, a pair of electric motors arranged in side-by-side relation carried by said intermediate partition, a blocking member in said case movable between blocking and release positions relative to said guide bores for blocking the snubber bar against movement to an unlocking position for the door bolting mechanism and releasing the snubber bar for movement to an unlocking position, main gear means having a drive formation driven thereby coactive with shoulder formations on said blocking member for moving the blocking member between said blocking and release positions responsive to rotation of the main gear means, a pair of drive trains coupled to and driven by the respective drive motors for driving the main gear means from either of said drive motors to shift the blocking member between said blocking and release positions, a printed circuit board having a solid state visible display strip thereon for displaying programmed instructions and information regarding the state of the time lock, the front wall of said lock case having a window therein aligned with said display strip for viewing of the displayed information therethrough, a plurality of electrical switch program buttons carried by said front wall of said lock case, a plurality of position sensors sensing the position of said blocking member and for sensing the position of the snubber bar in said guide bores, and electronic circuitry on said printed circuit board including microprocessor means interconnected with said program buttons and said electric motors and sensor means for activating the electric motors in accordance with predetermined time lock programs.

4,875,352

CONSTRUCTION KEYING

Jon M. Smallegan, San Mateo, and Richard R. Bettger, San Francisco, both of Calif., assignors to Schlage Lock Company, San Francisco, Calif.

Filed May 11, 1987, Ser. No. 48,441
Int. Cl.[4] E05B *19/08*
U.S. Cl. 70—395 **4 Claims**

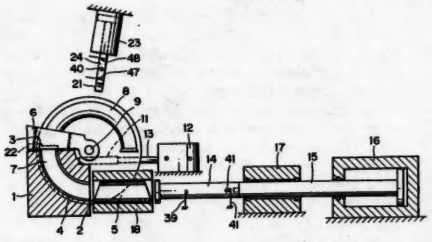


1. A substantially solid construction key insert for changing the combination of a cylindrical lock comprising: means for combinating a first plurality of cylindrical lock pin tumblers; guide means for accommodating entrance of a construction key to a keyway accessing said first plurality of pin tumblers and a second plurality of pin tumblers; means for connecting said means for combinating and said guide means for effecting insertion and removal of said means for combinating; and said means for connecting cohabits said keyway with a modified key section for combinating said second plurality of pin tumblers of a construction key in side by side relationship about a plane parallel to the plane of the longitudinal axis of said cylindrical lock pin tumblers during operation of the lock.

4,875,353
METHOD AND APPARATUS FOR MANUFACTURING CURVED PIPE

Toshio Kaneko, Kanagawa, Japan, assignor to Kabushiki Kaisha Asahi Kinzoku Kogyosho, Kawasaki, Japan

Filed Nov. 1, 1988, Ser. No. 265,487
Int. Cl.[4] B21D 7/08, 9/12
U.S. Cl. 72—133 4 Claims



1. A curved pipe manufacturing method comprising the steps of:

(1) providing a fixed die having a curved cavity, an entrance opening and an exit opening contained therein, said curved cavity being formed in a circular arc and extending from said entrance opening to said exit opening;

(b 2) providing a movable block having a curved mandrel attached to one side thereof;

(3) inserting the curved mandrel into the curved cavity of the fixed die through the exit opening therein and forming a curved annular chamber inside said cavity;

(4) pressing a work with a presser rod through said entrance opening into said curved annular chamber to form a curved pipe;

(5) moving the movable block so as to extract the mandrel and the curved pipe from said exit opening;

(6) inserting a retaining pin into a groove provided in the movable block for restraining a tip end of the curved pipe;

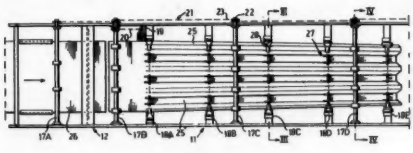
(7) further moving the movable block so as to extract the mandrel and the curved pipe from said exit opening, said curved pipe being restrained from movement by said retaining pin; and

(8) recovering said curved pipe.

4,875,354
MACHINE FOR ADJUSTABLE LONGITUDINAL CORRUGATING OF SHEET MATERIALS

Trond Nilsen, Engerjordet 19, 1310 Bloommenholm, and Erling C. Normann, Bjorketun 6, 7650 Verdal, both of Norway

PCT No. PCT/NO87/00007, § 371 Date Oct. 13, 1987, § 102(e) Date Oct. 13, 1987, PCT Pub. No. WO87/04375, PCT Pub. Date Jul. 30, 1987
PCT Filed Jan. 16, 1987, Ser. No. 104,011
Claims priority, application Norway, Jan. 17, 1986, 860156
Int. Cl.[4] B21D 13/04
U.S. Cl. 72—180 10 Claims



1. A machine for adjustable longitudinal corrugating of sheet materials, particularly of metal, with stepwise bending over free-running rollers and counter-rollers, so that alternating longitudinal convex and concave corrugations are formed with the convex corrugations establishing ridges and the concave corrugations establishing grooves, characterized in that

(1) at each profiling step there are sets of upward and downward free-running forming rollers, these forming rollers have means to be individually adjusted to vary the distance between the corrugations,

(2) at least one set of drive rollers are located with corresponding counter-rollers between an upstream and downstream profiling step, said drive rollers in each set are mounted on a common drive shaft and the counter-rollers are mounted on a free-wheeling shaft with the drive rollers and counter rollers arranged to only feed said corrugated sheet material, said forming roller sets and said drive roller sets are arranged alternately along said machine, the drive rollers and counter-rollers can be adjusted laterally to vary the distance between the corrugations,

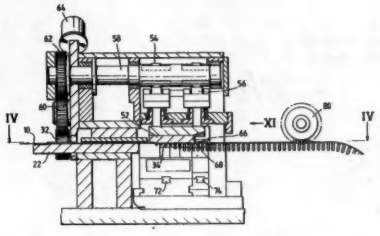
(3) all forming rollers which correspond to a ridge or groove lie in the same plane, points of contact between the sheet material and the forming rollers that form grooves, or ridges respectively, lie in a curved plane, the points of contact between the drive rollers and the sheet material lie in a common horizontal plane, and

(4) the forming rollers are arranged in pairs with a common free-running shaft, the forming rollers are equipped with an attachment means which permits location in any selected lateral position on a transverse beam which is part of each profiling step.

4,875,355
MANUFACTURE OF WIRE BINDING ELEMENTS

Leonard W. N. Jones, Hindhead, Great Britain, assignor to James Burn International Ltd., Great Britain

Filed May 19, 1988, Ser. No. 196,015
Claims priority, application United Kingdom, May 22, 1987, 8712148
Int. Cl.[4] B21F 45/16
U.S. Cl. 72—306 12 Claims



1. A binding strip forming machine comprising

rotary feed means for feeding a multi-prong binding strip into a forming station in response to rotation of said rotary feed means,

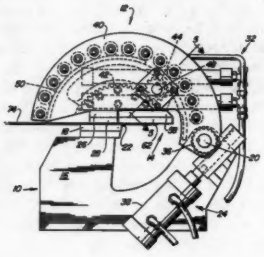
arresting means connected with said rotary feed means for arresting the feed of successive prongs in said forming station, these successive prongs being so arrested for at least one-eighth of each revolution of said rotary feed means, and

forming means located at said forming station for forming successive prongs of said binding strip into a desired configuration, said forming means being operative during that at least one-eighth of each revolution of said rotary feed means when said arresting means is arresting the feed of said binding strip.

4,875,356
MATERIAL FABRICATING MECHANISM

Peter W. Boardman, St. Catharines, and Daniel G. McCombs, Welland, both of Canada, assignors to Deere & Company, Moline, Ill.

Filed Aug. 23, 1988, Ser. No. 235,132
Int. Cl.[4] B21D 5/04
U.S. Cl. 72—321 43 Claims

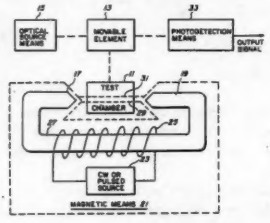


1. Mechanism for bending material including:
a material supporting member having a first clamping surface with an elongated edge;
clamping means carried on the supporting member and horizontally spaced from the first clamping surface, including a second clamping surface,
adapted for swinging movement towards and away from the first clamping surface;
a bending means including a bending surface carried by said clamping means and swingably movable therewith,
moveable through an arc relative to the edge of the first clamping surface to bend said material about said edge;
whereby the material can be clamped between the first and second clamping surfaces when the clamping means is moved towards the first surface and is subsequently bent by the bending surface as it is moved through an arc.

4,875,357
OPTICAL PARAMAGNETIC/DIAMAGNETIC GAS SENSOR

Thomas G. Giallorenzi, Springfield, Va., assignor to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 10, 1988, Ser. No. 154,565
Int. Cl.[4] G01R 33/12; G01N 27/74
U.S. Cl. 73—27 A 29 Claims

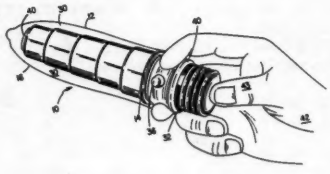


1. An apparatus for measuring the concentration of a paramagnetic or diamagnetic gas in a gaseous mixture, said apparatus comprising:
a chamber adapted to contain a gaseous mixture to be measured for the amount of a paramagnetic or diamagnetic gas in said mixture;
a reflective movable element coupled to said chamber;
a reflector;
optical source means for providing light to said movable element, said optical source means including:
an optical source for producing an input beam;
an optical coupler having first and second input ports and first and second output ports, said optical coupler being responsive to the application of said input beam to said first input port for providing substantially equal first and second incident beams at said first and second output ports, respectively;
a first light path for passing said first incident beam to said movable element for reflection therefrom and for passing said reflected first incident beam to said first output port with a phase indicative of the distance that said movable element is displaced;
a second light path for passing said second incident beam to said reflector for reflection therefrom and for passing said reflected second incident beam to said second output port with a reference phase, said optical coupler being responsive to said reflected first and second incident beams for developing at said second input port a light signal having an intensity proportional to the phase relationship between said reflected first and second incident beams;
magnetic means for developing a magnetic field across said chamber, said paramagnetic or diamagnetic gas in said chamber being responsive to the application of said magnetic field across said chamber for causing said movable element to be displaced by a distance proportional to the concentration of said paramagnetic or diamagnetic gas in said mixture; and
photodetection means for receiving a light signal from said movable element, said light signal having a characteristic indicative of the distance that said movable element is displaced, said photodetection means being responsive to said light signal for providing an output signal having an amplitude proportional to the concentration of said paramagnetic or diamagnetic gas in said gaseous mixture, said photodetection means including a photodetector responsive to said light signal for developing an electrical signal that has an amplitude proportional to the concentration of paramagnetic or diamagnetic gas in said gaseous mixture.

4,875,358
PREPARATION OF CONDOMS BY THE USER

Stephen A. Marsh, Watertown, Mass., and Robert W. Young, Locust Valley, N.Y., assignors to Stephan Marsh, Waltham, Mass.

Filed May 21, 1987, Ser. No. 53,203
Int. Cl.[4] G01M 3/26
U.S. Cl. 73—40 22 Claims



1. A device for preparation of a condom, the condom comprising an elongated, generally cylindrical membrane which is closed at one end and terminates at an annular ring at the other end,
said device defining a circular surface adapted to receive said annular ring in sealing or retaining relationship and further adapted to define, with said membrane, a chamber, and further defining an elongated, generally cylindrical form which is adapted to extend from said circular surface

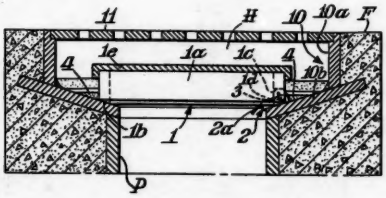
into said tubular membrane, said form adapted to support said condom to enable it to be rolled upon itself into compact form after being subjected to said inflating condition, said form being collapsible when not in use,
and gas inflation means for creating an inflating condition in said chamber.

4,875,359

ATTACHMENT RING FOR A LIQUID LEAKAGE SENSOR USED IN DRAIN OPENINGS

Jyuji Akiba, Saitama, Japan, assignor to Junkosha Co., Ltd., Japan

Filed Oct. 13, 1988, Ser. No. 257,317
Claims priority, application Japan, Oct. 16, 1987, 62-157
Int. Cl.[4] G01M *3/00*
U.S. Cl. 73—40 1 Claim



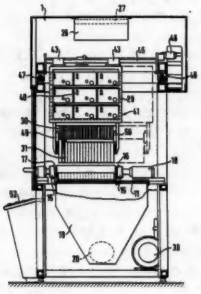
1. An attachment ring for a liquid leakage sensor used in drain openings comprising a cylindrical ring for installation in said drain opening, said ring having a top and bottom end, said ring extending over the entire circumference of the discharge of the drain opening when installed, said ring having a relatively small liquid-collecting opening in the bottom end of said cylindrical ring, and a liquid leak detecting sensor installed in said liquid-collecting opening, whereby, a liquid leak which flows into said drain is dammed by said attachment ring and channelled to flow into said liquid-collecting opening and to said sensor, thereby substantially reducing the time which would otherwise be required to detect said leak.

4,875,360

METHOD AND DEVICE FOR CHECKING FILTERS

Wolf Ziemer, Berlin, Fed. Rep. of Germany, assignor to Flaäkt AB, Nacka, Sweden

Filed May 2, 1988, Ser. No. 189,240
Claims priority, application Fed. Rep. of Germany, May 7, 1987, 3715214
Int. Cl.[4] G01M *3/20*
U.S. Cl. 73—40.7 20 Claims



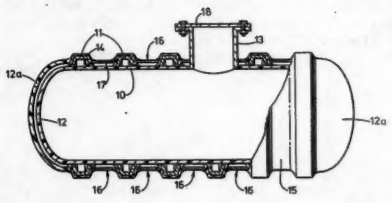
1. Method for checking filters for permeability, in particular for the presence of leaky or other faulty zones which have increased permeability in comparison with other filter regions for particles to be filtered from an air or gas flow, in which method: air or gas charged with said particles is applied to one surface of the filter; the opposite surface of the filter is scanned with an indicator system for indicating the penetration of particles by regional scanning performed by means of a plurality of suction nozzles, operating simultaneously, each scanning a given zone of the filter surface in a region; upon entry of a particle flow into each suction nozzle, a measuring device arranged beyond the flow path is separately influenced by the particle flow for each given zone within said scanned region; and the result for each zone within said scanned region emitting a particle flow is separately indicated.

4,875,361

DOUBLE WALLED STORAGE TANKS WITH COMMON RIB SUPPORTS

Bruce R. Sharp, 4090 Rose Hill Ave., Cincinnati, Ohio 45229

Filed Jul. 5, 1988, Ser. No. 186,190
Int. Cl.[4] G01M *3/00*
U.S. Cl. 73—49.2 26 Claims



1. A method of building a double walled ribbed storage tank system wherein an inner tank and an outer tank utilize a common set of support ribs for strength, comprising the steps of:
(a) forming a cylindrical-shaped inner tank having spaced support ribs on the outer surface of said inner tank; and
(b) forming an outer wall comprised of a series of sections which are at least partially separated from the inner tank's walls between each set of spaced support ribs, each section of said outer wall bonded to the side walls of the support ribs at a distance less than about 90% of the height of the support ribs such that the ribs protrude from the outer surface of the storage tank system,
wherein each section of the outer wall and the inner tank derive their strength from said support ribs so as to withstand external and internal load forces and wherein the outer wall sections act as a secondary containment means to contain any liquid which may leak from the inner tank.

4,875,362

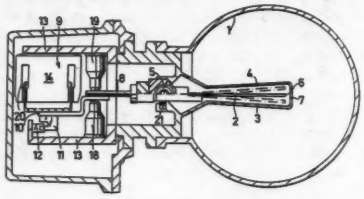
METHOD AND APPARATUS FOR MEASURING THE VISCOSITY OF A MEDIUM

Bengt Skallen, Saffle, Sweden, assignor to Eur-Control Kalle AB, Sweden

Filed Apr. 9, 1986, Ser. No. 849,761
Claims priority, application Sweden, Apr. 17, 1985, 8501892
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.
Int. Cl.[4] G01N *11/16*
U.S. Cl. 73—54 25 Claims

1. A method for measuring the viscosity of a medium with the aid of a pivotally suspended blade which extends into the medium and pivots between first and second end positions, said method comprising the steps of:
alternately and intermittently pivoting said blade between said first and second end positions by alternately applying constant but opposite forces to said blade, whereby the time it takes for said blade to move between said first and

second end positions varies as a function of the viscosity of said medium; and



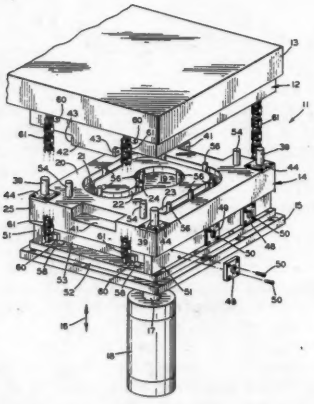
measuring the speed at which said blade moves between said first and second end positions, said speed being a function of the viscosity of said medium.

4,875,363

APPARATUS AND METHOD FOR TESTING FLOW CHARACTERISTICS OF MOLDING COMPOUNDS

Murli Hinduja; Mark L. Thompson, and John R. Spriggs, all of Fremont, Ohio, assignors to Sterling Engineered Products Inc., Maumee, Ohio

Filed Aug. 4, 1988, Ser. No. 228,373
Int. Cl.[4] G01N *11/04*
U.S. Cl. 73—56 **17 Claims**



1. An apparatus for testing the flow characteristics of molding compounds comprising:

a first mold portion having a generally circular cavity and a channel depression extending therefrom formed in a surface thereof;

a second mold portion having a generally circular raised area and a raised channel area extending therefrom formed on a surface thereof, said raised circular and channel areas being complementary to said cavity and channel depression, respectively;

means for moving said mold portions relative to one another, movement in a direction to separate said surfaces permitting a sample of material to be placed between said surfaces and movement in an opposite direction engaging said circular raised area with said cavity and engaging said raised channel area with said channel depression thereby applying pressure to the sample material causing the sample material to flow in said channel depression;

a plurality of scribe marks formed in a wall of said channel depression for indicating a flow characteristic of the sample material; and

means responsive to movement in a direction to separate said surfaces for removing the sample material from said cavity and said channel depression.

4,875,364

METHOD FOR MEASURING HEMOGLOBIN

Robert A. Levine, 31 Pilgrim La., Guilford, Conn. 06437, and Stephen C. Wardlaw, 191 N. Cove Rd., Old Saybrook, Conn. 06475

Continuation of Ser. No. 170,771, Mar. 21, 1988, Pat. No. 4,843,869. This application Apr. 5, 1989, Ser. No. 333,265
Int. Cl.[4] B01D *21/26*; A61B *5/14*
U.S. Cl. 73—61.1 R **1 Claim**

1. A method for measuring the hemoglobin concentration of the red blood cells in a sample of whole anti-coagulated blood, said method comprising the steps of:

(a) providing a transparent tube;

(b) drawing a sample of the blood into the tube;

(c) positioning a float member in the tube in the blood sample, said float member being made from a material which will float in the red blood cell layer of the blood sample when the tube is centrifuged with the blood sample and float member disposed therein;

(d) centrifuging the blood sample, float member, and tube to cause layering out of the red blood cells, white blood cells, and plasma, according to their respective densities;

(e) measuring the length of a portion of the float member which is submerged below the top of the red blood cell layer; and

(f) calculating the hemoglobin concentration as a function of the float member length which is submerged below the top of the red blood cell layer.

4,875,365

METHOD AND APPARATUS FOR MEASURING CUTTING FORCES OF MACHINE TOOL

John W. Powell, Raleigh, N.C., and Ted R. Massa, Latrobe, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Sep. 29, 1988, Ser. No. 251,155
Int. Cl.[4] G01L *5/16*
U.S. Cl. 73—104 **20 Claims**

1. A plate-type force transducer for measuring cutting forces in a bolted joint of a machine tool comprising:

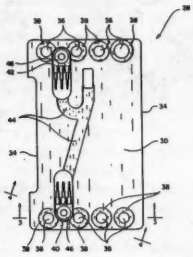
(a) a plate having first and second sides;

(b) a series of bolt openings formed in the plate for receiving bolts that permit the plate to be secured within the joint;

(c) raised force shunting pads formed about the bolt openings on both sides of the plate and elevated relative to the sides of the plate such that when the plate forms a part of the joint the raised force shunting pads actually engage adjacent bearing surfaces of the joint while the sides of the plate are at least slightly spaced from the adjacent bearing surfaces of the joint;

(d) at least one load cell cavity formed in the plate closely adjacent at least one bolt opening;

(e) a load cell mounted in the cavity and having a loading surface raised slightly above the surface of the raised force



shunting pads such that the load cell is appropriately pre-loaded but not overloaded.

4,875,366

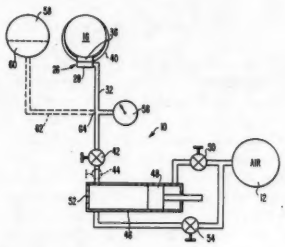
APPARATUS AND METHOD FOR THE FIELD MEASUREMENT OF BEARING LUBRICANT AND SEAL INTEGRITY TESTING

John K. Kesler, Silver Spring; Robert J. McCown, Seabrook, both of Md., and John J. Shia, Richmond, Va., assignors to ENSCO. Inc., Springfield, Va.

Filed Jul. 20, 1988, Ser. No. 221,597

Int. Cl.[4] G01M *19/00*

U.S. Cl. 73—118.1 **18 Claims**



1. A method for the field measurement of bearing lubricant in a test bearing which includes:

obtaining a control pressure value indicative of the pressure which would be generated by injecting a controlled vehicle of air or gas into the test bearing with the test bearing containing an allowable amount of lubricant at the existing ambient temperature and atmospheric pressure,

injecting the same controlled volume of air or gas into the test bearing, and

subsequently obtaining a test pressure value resulting from the injection of the controlled volume of air or gas into the test bearing.

4,875,367

STEERING TORQUE DETECTING DEVICE

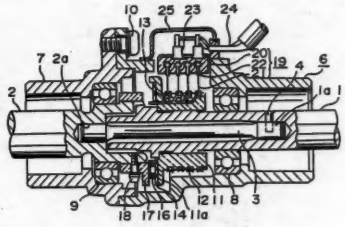
Mitsuharu Morishita; Shinichi Kohge; Tadayuki Hara; Yasuaki Hata, and Hisato Umemaru, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 177,085, Apr. 4, 1988, Pat. No. 4,838,074. This application Oct. 20, 1988, Ser. No. 260,298

Claims priority, application Japan, Apr. 6, 1987, 62-52839 [U]; Apr. 6, 1987, 62-52840[U]; Apr. 22, 1987, 62-61811[U]; Apr. 22, 1987, 62-61812[U]

Int. Cl.[4] G01M *17/06*

U.S. Cl. 73—118.1 **3 Claims**



1. A steering torque detecting device, comprising:

a steering shaft having an input shaft and an output shaft,

a torsion bar provided between said input shaft and said output shaft,

a torque detecting unit for converting a quantity of torsion produced in said torsion bar into an electric output,

an electricity collecting unit comprising a slip ring holder having a flange at one end portion thereof, a plurality of slip rings and brushes which receive said electric output and supply electric power from an outer power source, a plurality of bearings for supporting said input and output shafts on substantially the same axial line, and housing means for supporting said bearings, a terminal block to which said brushes are mounted, a through capacitor interposed between said terminal block and a drawing wire for communicating detection signals outside; and

a potentiometer attached to said flange of said slip ring holder.

4,875,368

PRESSURE SENSOR SYSTEM

Leroy C. Delatorre, Sugar Land, Tex., assignor to Panex Corporation, Sugar Land, Tex.

Division of Ser. No. 102,020, Sep. 8, 1987. This application Dec. 22, 1988, Ser. No. 288,308

Int. Cl.[4] G01L *7/06, 9/12*

U.S. Cl. 73—151 **16 Claims**

14. A measurement system for use in a downhole well tool for sensing pressure data including

well tool housing means adapted for passage through a well bore to a well depth for sensing well pressure data;

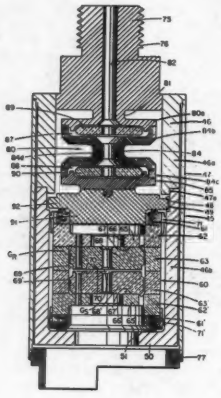
said well tool housing means including an outer housing means constructed from load supporting materials and including interconnected sections, said interconnected sections having hollow interiors for containing instrumentation for use in sensing well pressure data;

one of said sections including first and second tubular outer housing members interconnected by a ring member and where said first tubular outer member is constructed and arranged to enclose electrical components;

a tubular inner support housing member disposed within said second tubular outer housing member where said second outer housing member is connected at a terminal end to a terminal end of said second tubular outer housing member, said inner support housing member having an inwardly directed flange portion at an opposite terminal end, said inner support housing member being separated

from the inner wall of said second outer housing member by an annular space;

bellows means and measurement transducer means disposed within said inner support housing member with said transducer means including a quartz material under compression and with said bellows means attached at a terminal



end to said inner support housing member so that fluid under pressure applied to the interior of said bellows means produces a displacement of said quartz material as a function of pressure; and

means for providing fluid access from the exterior of said well tool to the interior of said bellows means.

4,875,369

PRESSURE SENSOR SYSTEM

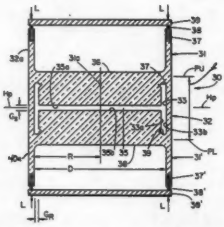
Leroy C. Delatorre, Sugar Land, Tex., assignor to Panex Corporation, Sugar Land, Tex.

PCT No. PCT/US87/02285, § 371 Date Sep. 8, 1987, § 102(e) Date Sep. 8, 1987, PCT Pub. No. WO89/02512, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 8, 1987, Ser. No. 102,020

Int. Cl.[4] E21B *47/00*

U.S. Cl. 73—151 **19 Claims**



1. A transducer for measuring the displacement of an elastic support member under compression as a function of an applied compressive force comprising:

a support member constructed of a material which responds to forces to be measured with repeatable elastic characteristics and which responds to changes in temperature within a range of operating temperatures with retraceable characteristics and which has a low temperature coefficient of expansion;

said support member having a first set of first facing surfaces defining a first spacing gap where said first facing surfaces are displacable relative to one another as a function of compression of said support member;

first capacitor plate means on said first facing surfaces for deriving a first capacitance measurement as a function of displacement of said first facing surfaces;

said support member having a second set of second facing surfaces defining a second spacing gap located transversely relative to said first spacing gap in said support member; and

second capacitor plate means on said second facing surfaces for deriving a second capacitance measurement as a function of displacement of said second facing surfaces where said first and second capacitance measurements are interrelated functions of the temperature of said support member and where said first and second capacitance measurements are interrelated functions of the displacement of said first facing surfaces and said second facing surfaces.

4,875,370

APPARATUS FOR MEASURING THE CONTENTS OF A TANK

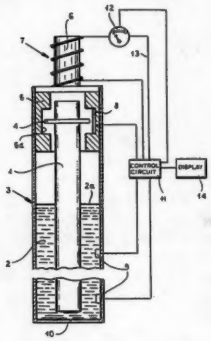
Martin Spitzer, Weikendorf, Austria, assignor to Witronic Elektronische Gerate Gesellschaft M.B.H., Vienna, Austria

Filed Feb. 7, 1989, Ser. No. 307,652

Claims priority, application Austria, Feb. 8, 1988, 256/88

Int. Cl.[4] G01F *23/62, 23/30*

U.S. Cl. 73—309 **9 Claims**



1. An apparatus for measuring a quantity of liquid in a tank, comprising:

an upright rod extending into said liquid in said tank whereby a buoyancy force applied by said liquid to said rod varies as a level of said liquid in said tank varies;

an electromagnet juxtaposed with a magnetically attractable portion of said rod and electrically energizable to support said rod magnetically in said tank;

an electrical control circuit connected with said electromagnet for supplying electrical current to said electromagnet;

a position sensor responsive to the position of said rod in said tank and controlling said circuit whereby the electrical current supplied by said circuit to said electromagnet is varied to maintain a predetermined position of said rod as said level of said liquid in said tank varies; and

indicator means coupled to said circuit and responsive to the magnitude of the electrical current supplied to said electromagnet for indicating said level and hence the quantity of liquid in said tank.

9. A method of measuring a quantity of liquid in a tank, comprising the steps of:

(a) disposing an upright rod in said tank so as to extend into the liquid therein whereby a buoyancy force applied by said liquid to said rod varies as a level of said liquid in said tank varies;

(b) energizing an electromagnet juxtaposed with a magneti-

cally attractable portion of said rod with an electric current to support said rod magnetically in said tank;

(c) controlling said electrical current to maintain a predetermined position of said rod in said tank whereby the electrical current supplied to said electromagnet is varied as said level of said liquid in said tank varies; and

(d) measuring the magnitude of the electrical current supplied to said electromagnet for indicating said level and hence the quantity of liquid in said tank.

4,875,371

DETERMINING IMPURITIES IN SAMPLES

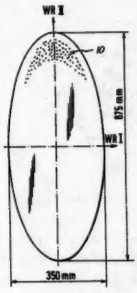
Josef Gronsfeld, Toenisvorst; Hatto Jacobi, Duesseldorf, and Hans-Jüergen Bäethmann, Moers, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,764

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 3724627; Oct. 23, 1987, 3736389

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—598 **15 Claims**



1. Method for making a sample for ascertaining impurities in metal products, particularly steel products made by continuous casting, comprising the steps of:

cutting a preparatory sample from the object to be tested which has at least a ten-fold thickness of the sample thickness for comfortably providing ultrasonic testing;

the thickness dimension of said preliminary sample extends in a plane parallel to the direction of casting and/or to the main direction of immediately preceding deforming, there being plane parallel cutting surfaces at right angles to said thickness dimension;

heating said preliminary sample to a comparatively high deforming temperature; and

deforming that sample by reducing said preliminary sample transversally to the thickness dimension to a desired sample thickness.

4,875,372

ECHO CANCELLATION SYSTEM

Dennis H. Gilbert, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 3, 1988, Ser. No. 189,898

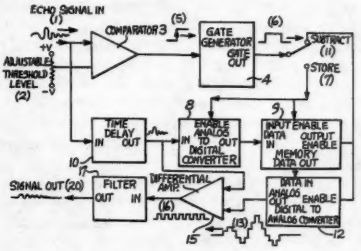
Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—614 **2 Claims**

1. In an ultrasonic inspection system, the method of detecting flaws near the surface of an inspected part including the steps of:

storing in memory, a signal representative of a surface echo, and then,

subtracting in a differential amplifier the signal representative of said surface echo from a signal representative of the inspected part thereby effecting cancellation of said signal representative of a surface echo and enabling detection of



weaker signals representative of echoes from defects near the surface of the inspected part to be detected.

4,875,373

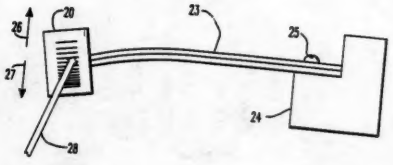
TEMPERATURE COMPENSATED FIBER OPTIC VIBRATION SENSOR

Michael Twerdochlib, Oviedo, Fla., assignor to Westinhouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 25, 1988, Ser. No. 223,307

Int. Cl.[4] G01D *5/34*

U.S. Cl. 73—655 **13 Claims**



10. In a vibration sensor of the type which includes a grid supported on a support structure for oscillatory motion in the path of a light beam, the improvement wherein:

said support structure comprises a temperature responsive positioning means operable to position said grid with respect to the path of the light beam in dependence upon the temperature; and

said sensor comprises a graded density pattern of light modification means disposed on said grid.

4,875,374

MULTIPLE AXIS VIBRATION TEST PLATFORM

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed May 3, 1988, Ser. No. 189,719

Int. Cl.[4] B06B *3/00*

U.S. Cl. 73—663 **14 Claims**

1. A multi-axis vibration test platform, comprising:

a test platform having a top surface, a bottom surface, side walls, and end walls, said platform being simultaneously movable along selected ones of first, second, and third

axes of vibration which intersect at a center of said test platform;

a plurality of actuator arms having first and second ends;

a plurality of rotatable drive shafts and means for independently rotating each of said drive shafts;

first means, including eccentrically coupled ball joints, for connecting said first end of each said actuator arm to a respective one of said plurality of drive shafts to reciprocate each said actuator arm along a respective one of said axes in accordance with the eccentricity of said eccentrically coupled ball joint as said respective drive shaft is rotated;

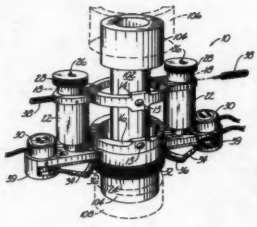
second means, including concentrically coupled ball joints, for connecting said second end of each said actuator arm to a respective one of said bottom surface, side walls, and end walls of said test platform, said concentrically mounted ball joints permitting out of axis rotation of said actuator arms relative to said test platform.

4,875,375

AXIAL-TORSIONAL EXTENSOMETER

Han-Chin Wu, and Zhiyou Xu, both of Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa

Filed Mar. 3, 1989, Ser. No. 318,547
Int. Cl.[4] G01N *3/00*
U.S. Cl. 73—795 **10 Claims**



1. An axial-torsional extensometer for measuring deformation of a specimen subjected to combined axial-torsional loading conditions, said specimen including ends and an intermediate gage section, said extensometer comprising:

means for applying axial and torsional forces to the ends of said specimen;

a first holder plate;

a first set ring attached to said first holder plate, said first set ring including means for securing said first set ring to said specimen at a first axial location;

a first guide tube attached to said first holder plate and disposed laterally of said first set ring;

a second holder plate;

a second set ring rotatably attached to said second holder plate, said second set ring including means for securing said second set ring to said specimen at a second axial location axially spaced from said first axial location, the axial spacing of said first and second set rings defining the length of said gage section of said specimen;

a second guide tube attached to said second holder plate and disposed laterally of said second set ring, said second guide tube being disposed to engage said first guide tube to secure said first and second holder plates in radial alignment;

axial measuring means operably attached to said first and second guide tubes for measuring the axial deformation of said specimen;

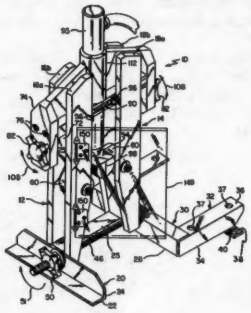
torsional measuring means operably attached to said second holder plate for measuring the torsional deformation of said specimen.

4,875,376

GUIDED-BEND TEST APPARATUS

Glenn N. Fischer, Fischer Engineering Co., 7595 E. Singer Rd., Dayton, Ohio 45424

Filed Jun. 13, 1988, Ser. No. 205,980
Int. Cl.[4] G01N *3/20*
U.S. Cl. 73—852 **8 Claims**



1. Guided-bend test apparatus comprising:

opposed pairs of spaced, vertically extending legs,

roller means supported intermediate upper and lower ends of said pairs of vertically extending legs,

bracket means fixed to each of said pairs of legs above said roller means and adjacent upper ends of said legs and including substantially horizontally disposed portions,

cylinder ram holder base means bridging said opposed pairs of vertically extending legs and supported by and slidably engaging said horizontally disposed portions of said bracket means, and

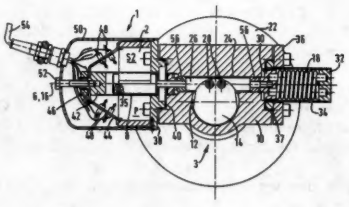
means interconnecting said cylinder ram holder base means and said bracket means for effecting relative sliding movement therebetween, whereby the apparatus is used to carry out a guided-bend test.

4,875,377

FLOWMETERS

Robert A. Robertson, Hereford, United Kingdom, assignor to Spirax Sarco Limited, United Kingdom

Filed Oct. 30, 1987, Ser. No. 115,054
Int. Cl.[4] G01F *1/22*
U.S. Cl. 73—861.02 **6 Claims**



1. A flowmeter comprising:

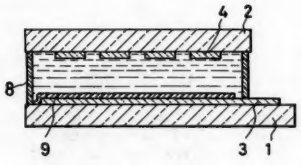
a body;
a flow passage provided in the body;
a first sensor comprising a flow rate transducer adapted to provide a signal which is dependent upon the flow rate through the flow passage;
a second sensor comprising a temperature sensor for providing a signal that is dependent upon the temperature of fluid flowing in the flow passage; and
process means for receiving the signals from the first and second sensors and for deriving from those signals an output signal representing the true mass flow rate of the fluid flowing;
the flow rate transducer comprising:
a stationary ferromagnetic outer ring mounted on the body;
a ferromagnetic inner core which is rotatable relatively to the outer ring about an axis;
a primary coil and a plurality of secondary coils mounted on the outer ring, the coils being spaced apart from one another about the axis, the primary coil being coupled to the secondary coils through two separate magnetic paths each including the outer ring and the inner core, and the coils being disposed so that relative rotation of the inner core varies the relative magnetic coupling between the primary coil and the respective secondary coils thereby to provide a signal that is dependent upon the position of the inner core;
a flap disposed in the flow passage of the flowmeter so as to be movable against a bias by fluid flowing through the flow passage, the flap being coupled to the inner core so as to rotate the inner core relatively to the outer ring upon movement of the flap; and
a tubular enclosure accommodating, and coaxial with, the core, the enclosure being plugged at one end and sealed at the other end with respect to the body, the enclosure being open at this other end to the flow passage but otherwise sealed so that the core is hermetically sealed from the outer ring.

4,875,378

PRESSURE SENSOR WITH A FERROELECTRIC LIQUID CRYSTAL LAYER

Shunpei Yamazaki, Tokyo, and Akira Mase, Atsugi, both of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Filed Jan. 29, 1988, Ser. No. 150,150
Claims priority, application Japan, Feb. 19, 1987, 62-37566
Int. Cl.[4] G01L *5/16, 1/16;* H01L *41/18*
U.S. Cl. 73—862.04 **6 Claims**



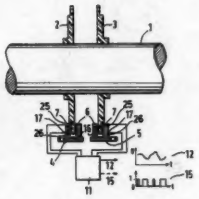
2. A pressure sensor comprising:
a pair of substrates;
a ferroelectric liquid crystal layer interposed between said pair of substrates;
a plurality of column electrodes and one or more row electrode arranged on the opposed insides of said substrates in a matrix form; and
a detecting means connected with said column and row electrodes for detecting the piezoelectric voltage produced between particular column and row electrodes.

4,875,379

APPARATUS FOR MEASURING THE TORQUE OF AN OPERATING SHAFT

Ulrich Rohs, Roonstr. 11, D-5160 Dueren, and Herbert Meuter, An der Weingass 24, D-5100 Aachen, both of Fed. Rep. of Germany

Filed Oct. 27, 1988, Ser. No. 263,064
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736533
Int. Cl.[4] G01L *3/10*
U.S. Cl. 73—862.34 **9 Claims**



1. A device for measuring the torque of a rotating shaft comprising:
a first measuring disk having two concentric graduated circular areas mounted on the rotating shaft for rotation therewith;
a second measuring disk having two concentric graduated circular areas, mounted on said shaft for rotation therewith axially spaced from said first measuring disk along the shaft;
a multiplicity of pulse generators evenly distributed around said two concentric graduated circular areas on each of said first and second measuring disks, the number of said multiplicity of pulse generators being different on every concentric circular area on said first and second measuring disks;
emitters associated with a first side of each said first and second measuring disks for emitting energy onto said multiplicity of pulse generators;
receivers associated with a second side of each of said first and second measuring disks for receiving the energy transmitted by said pulse generators, said receivers generating voltage pulses; and
an electronic comparator for comparing the voltage pulses produced by said receiver associated with said first and second disks.

4,875,380

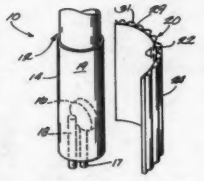
CORRUGATED JACKET FOR MOLTEN METAL SAMPLER

Joseph J. Boron, Medina, Ohio, assignor to Midwest Instrument Co., Inc., Hartland, Wis.

Filed Dec. 22, 1987, Ser. No. 136,849
Int. Cl.[4] G01N *1/12*
U.S. Cl. 73—864.58 **3 Claims**

1. An immersion vehicle for studying the properties of molten metal including a vehicle body for supporting analysis apparatus and a handle for manipulating the vehicle body in molten metal, the improvement wherein said body is provided with channel means arranged along the exterior of the body to afford release of gas caused by reaction of the vehicle body with the molten metal above the immersion line in the molten metal to minimize splashing of molten metal and to protect the vehicle body and wherein said channel means comprises a

wrap of corrugated board having sequential alternate peaks and valleys in which the peaks define channels which direct



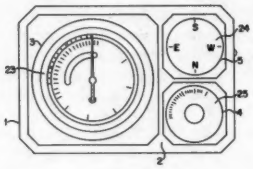
the gas caused by the reaction of the vehicle body with the molten metal above the molten metal surface.

4,875,381

MOUNTING CONTAINER FOR MEASURING INSTRUMENTS

Toshikazu Yusa, 8-15, Ooyama-cho, Shibuya-ku, Tokyo, Japan

Filed Feb. 22, 1988, Ser. No. 158,765
Int. Cl.[4] G01D *11/30, 11/24*
U.S. Cl. 73—866.3 **6 Claims**



1. A mounting container for housing therein a plurality of measuring instruments each comprising a case body, the mounting container comprising:

fitting openings formed in an upper bottom of a shallow upper case with a lower bottom thereof opened;

an insertion hole formed by cutting through a part of a side of a shallow lower case with a top thereof opened;

projections formed along a side surface of said insertion hole;

said upper case and lower case arranged to engage with each other such that the respective open surface of said cases face each other and the cases can be attached and detached;

an outer engaging bore formed in the lower case near one side of a lower bottom of said lower case, and inner engaging bores formed in the lower case closer to the center of the lower bottom of said lower case;

a case body small in comparison to the size of any of the case bodies of the housed measuring instruments inserted into said insertion hole via projecting portions which fit into projections provided along side surfaces of said insertion hole of said lower case; and

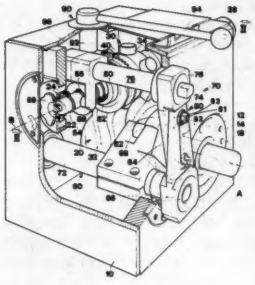
a hinge fitting comprising first and second pieces coupled by a pin, said first piece of said hinge fitting having projections which are inserted into said outer engaging bore and inner engaging bore, said second piece of said hinge fitting being a little longer than said first piece.

4,875,382

STEPPING DRIVE

Anton Becker, Aachen, Fed. Rep. of Germany, and Felix Kramer, Friedlisberg, Switzerland, assignors to Elpatronic AG, Zug, Switzerland

Filed Feb. 4, 1988, Ser. No. 152,074
Claims priority, application Switzerland, Mar. 20, 1987, 01074/87
Int. Cl.[4] F16H *27/04;* F16D *43/20*
U.S. Cl. 74—84 R **11 Claims**



1. A stepping drive having a first rotary member which can be driven by a driving shaft, a second rotary member by which a driven shaft can be driven, the two rotary members being in an engaged relationship whereby a continuous rotation of the first rotary member can be converted to an intermittent rotation of the second rotary member, characterized in that

one of the two rotary members is connected to the associated shaft by a clutch,

associated with the clutch is a retaining member which exerts a retaining force acting in the engagement sense thereon, and

associated with one of the shafts is a control device operatively connected with the retaining member and controlling the retaining force as a function of the angular position of rotation of said one of the shafts.

4,875,383

DUAL RATIO TRANSMISSION SHIFTER ASSEMBLY WITH NEUTRAL SAFETY SWITCH

James L. Holman, Wauseon, and George A. Willford, Toledo, both of Ohio, assignors to Dana Corporation, Toledo, Ohio

Filed Feb. 23, 1989, Ser. No. 314,456
Int. Cl.[4] B60K *20/00;* F16H *3/02*
U.S. Cl. 74—473 R **11 Claims**

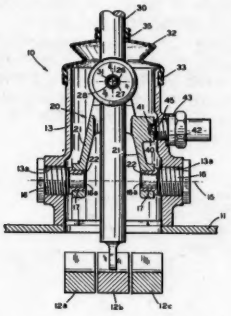
1. A shift assembly for a transmission having a plurality of movable shift rails comprising:

a hollow tower having a lower end connected to the transmission;

a yoke mounted within said tower for pivoting movement relative thereto about a first axis; and

a shift lever mounted on said yoke for pivoting movement relative thereto about a second axis, said second axis being disposed above said first axis, said shift lever extending into cooperation with the shift rails, said shift lever being

movable about said second axis for selecting one of the shift rails for movement and being movable with said yoke



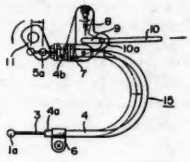
about said first axis for moving the selected one of the shift rails.

4,875,384

THROTTLE LEVER MECHANISM

Koji Hirayama, Ome, and Fumihiko Aiyama, Musashimurayama, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Nov. 13, 1987, Ser. No. 119,928
Claims priority, application Japan, Nov. 14, 1986, 61-174887
Int. Cl.[4] F16C *1/10*
U.S. Cl. 74—500.5 **2 Claims**



1. A throttle lever mechanism for use in a machine comprising:

a wire cable arranged in a curved manner having a first end and a second end, said first end connected to a throttle valve opening and closing member of a carburetor;

a first throttle level for operation by one hand of an operator, said second end being connected to said first throttle lever;

an outer tube covering said wire cable having a first end portion and a second end portion, said first end portion being held in a stationary manner;

a link member having an elongated slot formed therein and being rotatably supported on a machine body, said second end portion of said outer tube being coupled to said link member;

a second throttle level for operation by the other hand of the operator;

a connecting rod movable within the elongated slot and connecting said link member to said second throttle lever, and

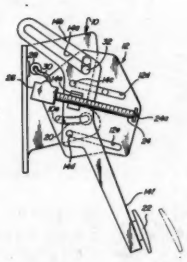
wherein when either of said first and second throttle levers is released from the respective hand of the operator said first end of said wire cable is returned to a first position and the throttle valve opening and closing member is returned to a home position such that an engine of the machine is returned to an idling condition.

4,875,385

CONTROL PEDAL APPARATUS FOR A MOTOR VEHICLE

Gabriel M. Sitria, 6127 Orchard Lake Rd., Apt. 104, West Bloomfield, Mich. 48033

Continuation of Ser. No. 897,197, Aug. 18, 1986, abandoned.
This application Apr. 25, 1988, Ser. No. 188,122
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—512 **18 Claims**



1. A control pedal apparatus for a motor vehicle comprising:

(A) a mounting bracket adapted to be mounted on a fixed structure of the vehicle;

(B) a pedal assembly including an elongated pedal arm and an adjacent member;

(C) pivot means mounting the upper end of said pedal assembly for pivotal movement on said bracket about a pivot axis;

(D) a pedal pad mounted on the lower end of said pedal arm;

(E) attachment means on said adjustor member defining an attachment point for attachment of a control member for operation of a control system of the vehicle in response to pivotal movement of said pedal assembly upon the application of operator pressure to said pedal pad;

(F) a pair of pins on said pedal arm spaced longitudinally along the length of said pedal arm;

(G) a pair of parallel tracks on said adjustor member respectively slidably receiving said pins;

(H) a nut carried b said pedal arm at a location therealong between said pins; and

(I) a screw positioned between said tracks and extending generally in a direction of said tracks, threadably engaging said nut, and operative in response to rotation of said screw to cause said pins to slide in said tracks to slidably adjust said pedal arm on said adjustor member so as to selectively move said pedal pad relative to said bracket without moving said attachment point relative to said bracket.

4,875,386

HANDLEGRIP CRUISE ASSIST DEVICE

Daryl E. Dickerson, P.O. Box 1222, Grants Pass, Oreg. 97526

Filed Jun. 5, 1989, Ser. No. 361,990
Int. Cl.[4] B62K *21/12, 21/26*
U.S. Cl. 74—551.9 **2 Claims**

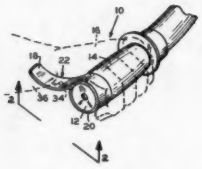
1. A handlegrip cruise assist device, in combination with a rotatable throttle handlegrip having a return-to-idle bias, as found on motorcycles and the like, the handlegrip cruise assist device comprising:

an elongated, stiff, resilient member having a lever segment and a circular segment, which are formed as a single piece;

the circular segment being formed into a circular shape having a slightly smaller diameter than an outer end of the throttle handlegrip and which terminates before the circular shape closes, with a variable gap remaining, so that downward pressure on the lever segment reduces the gap and the diameter of the circular segment thereby tightening the encircling grip and upward pressure on the lever

segment increases the gap and diameter of the circular segment thereby loosening the encircling grip to readily permit rotation of the cruise assist device with respect to the the handlegrip for rapid and simple adjustment of the position of the device on the throttle handlegrip;

the lever segment extending from the circular segment and



tangentially from the throttle handlegrip towards the operator;

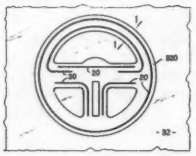
wherein downward pressure from the palm heel of the operator's hand and adjoining wrist area against the lever segment serves to overcome said return-to-idle bias and thus maintain the position of the rotatable throttle handlegrip at the desired throttle setting.

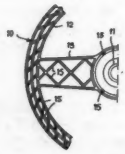
4,875,387

LIGHTENED STEERING WHEEL, IN PARTICULAR FOR A MOTOR VEHICLE, PRODUCED FROM STAMPABLE, REINFORCED, SYNTHETIC MATERIALS AND PROCESS FOR THE MANUFACTURE THEREOF

Christian Henigue, Delle, France, assignor to Equipments Et Composants Pour L'Industrie Automobile, Audincourt, France

Filed Sep. 23, 1988, Ser. No. 248,073
Claims priority, application France, Sep. 25, 1987, 87 13323
Int. Cl.[4] B62D *1/04*
U.S. Cl. 74—552 **10 Claims**





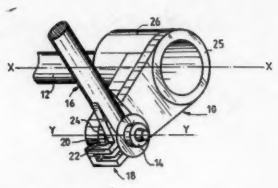
1. Lightened steering wheel, particularly for a motor vehicle, comprising, inter alia, a central hub (11), a peripheral rim (12), and at least one approximately radial branch (13) connecting said hub and said rim, characterized in that at least said rim and branch are made from blanks of at least one stampable, synthetic material charged with long fibres which are uninterrupted in each blank, said blanks being made only of said stampable synthetic material charged with said long fibres.

4,875,388

DEVICE OF THE CRANK CONNECTING ROD TYPE, IN PARTICULAR FOR CONTROLLING A VENTILATION LOUVER IN AN AUTOMOBILE HEATING OR AIR CONDITIONING UNIT

Jean F. Bouvot, Dampierre, France, assignor to VALEO, Paris, France

Filed Aug. 30, 1988, Ser. No. 238,101
Claims priority, application France, Sep. 10, 1987, 87 12571
Int. Cl.[4] G05G *1/00*; B60H *1/00*
U.S. Cl. 74—579 R **10 Claims**



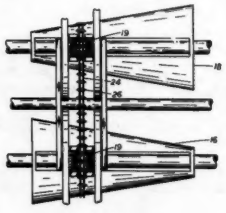
1. A device of the crank connecting rod type, including a crank arm (10) capable of being mounted to swivel about an axis (X—X) and provided with a pivot (14) having a pivot axis (Y—Y), and a connecting rod (16), said connecting rod (16) being pivotally received on said pivot and including an extension (18) which is parallel to the axis of the pivot (14) and is extended, beyond a connecting rod bearing face (20) between the connecting rod and pivot, by a radial tooth (22) arranged to remain in engagement with a rim (24), defined on said crank arm about said pivot, in any operating position of the connecting rod, said extension (18) comprising a first leg (96_1, 96_2) extending from the connecting rod (16) perpendicular to the axis of the pivot (14), and a second leg (98_1, 98_2) at right angles to the first leg, said extension being elastically deformable, to permit the spacing apart of the radial tooth (22) with respect to the axis (Y—Y) of the pivot (14) during the mounting of the connecting rod (16) and crank (10), to allow the passage at the rim (24) of the crank arm and the return of the radial tooth (22) to its initial position of repose to engage the rim (24) and be clipped thereon.

4,875,389

CHAIN DRIVEN, CONTINUOUSLY INFINITE VARIABLE SPEED TRANSMISSION SYSTEM

Frank Fragnito, 11 Holmes Ave., North Babylon, N.Y. 11703

Continuation-in-part of Ser. No. 468,324, Mar. 23, 1983, Pat. No.
Int. Cl.[4] F16H *9/26*
U.S. Cl. 74—689 **8 Claims**



6. A chain driven continuously variable speed transmission system comprising frame means, input driving means for rotation within said frame means, a first conical gear coupled to said input driving means, a second conical gear having its longitudinal axis parallel to the longitudinal axis of said first

conical gear and lying in the same plane as that of said first conical gear with the end of the second conical gear having the largest diameter positioned in relative proximity to the end of said first conical gear having the smallest diameter, and the end of said second conical gear having the smallest diameter positioned proximate to the end of the first conical gear having the largest diameter, a continuous flexible chain having pins extending therefrom and encircling said first and second gears and being driven by said first conical gear to drive said second conical gear, a plurality of flexible chain receiving means comprising spiral gears within said first and second conical gears engaged by said pins extending from said flexible chain and an output shaft coupled to said second conical gear for transmitting power to a load.

4,875,390

SHIFT CONTROL DEVICE FOR HYDROSTATIC CONTINUOUSLY VARIABLE TRANSMISSION

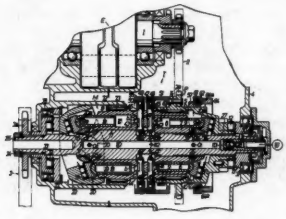
Tsutomu Hayashi; Masaie Katoh, both of Tokyo; Nobuyuki Yakigaya, Chiba; Kazuhiko Nakamura, Kanagawa; Yoshihiro Yoshida; Yoshihiro Nakajima, both of Tokyo; Mitsuru Saito, Tokyo, and Akio Kobayashi, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1987, Ser. No. 28,528

Claims priority, application Japan, Mar. 24, 1986, 61-65484; Apr. 8, 1986, 61-80812

Int. Cl.[4] F16H *47/04*

U.S. Cl. 74—731 **24 Claims**



1. A shift control device in a hydrostatic continuously variable transmission in which a hydraulic closed circuit is formed between a swash plate type hydraulic pump and a swash plate type hydraulic motor, and a swash plate holder for supporting a motor swash plate of the hydraulic motor is tiltably supported on a stationary structure through a trunnion shaft fixedly mounted to said swash plate holder, wherein a drive shaft of a reversible electric motor is connected to the trunnion shaft through a reduction device which is constructed so as to transmit rotation of said electric motor to said trunnion shaft at a reduced speed but to be brought into a locked state when receiving a reverse load from said trunnion shaft, and means is provided to control the operation of said reversible electric motor, said control means being capable of selectively assuming a first state in which said electric motor is controlled according to a load of an engine associated with said transmission and a second state in which said electric motor is controlled according to a shift ratio of said transmission.

4,875,391

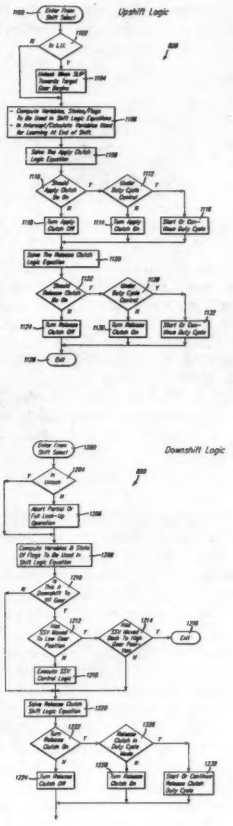
ELECTRONICALLY-CONTROLLED, ADAPTIVE AUTOMATIC TRANSMISSION SYSTEM

Maurice B. Leising, Clawson; Howard L. Benford, Bloomfield Hills, and Gerald L. Holbrook, Rochester Hills, all of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 187,772

Int. Cl.[4] B60K *41/06*

U.S. Cl. 74—866 **6 Claims**



1. In an automatic transmission having a plurality of gears for transmitting power from a prime mover to a load device over desired ranges of torque and speed, and an assembly of friction elements, with hydraulic fluid associated with the operation of the friction elements, the friction elements for selectively disengaging and engaging the gears from the prime mover, a control system for controlling the selection and engagement of the gears, comprising:

means for sensing the input and output speeds of the transmission;

means for sensing the power demand on the prime mover;

means for providing an indication of an operator selected mode of operation for the transmission;

means for controlling the flow of hydraulic fluid associated with the operation of the friction elements; and

electronic controller means for controlling the actuation of

the means for controlling the flow of hydraulic fluid to regulate the application and release of pressure to and from the friction elements in response to signals from the means for sensing the input and output speeds of the transmission, the means for sensing the power demand on the prime move, and the means for providing an indication of an operated selected mode of operation for the transmission, the controller means for controlling the actuation of the means for controlling the flow of hydraulic fluid by making adjustments to a duty cycle of the means for controlling the flow of hydraulic fluid such that the adjustments are made continuously in a real time, closed loop manner for causing the transmission to follow a set of predetermined shift schedules.

4,875,392

MANUAL VALVE IN AN AUTOMATIC TRANSMISSION

Yoshinari Kuwayama, Tokoname; Fumitomo Yokoyama, Anjo, and Masakatsu Miura, Kariya, all of Japan, assignors to Aisin-Warner Kabushiki Kaisha, Aichi, Japan

PCT No. PCT/JP87/00453, § 371 Date Mar. 1, 1988, § 102(e) Date Mar. 1, 1988, PCT Pub. No. WO88/00303, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 30, 1987, Ser. No. 172,724

Claims priority, application Japan, Jul. 1, 1986, 61-154694

Int. Cl.[4] B60K *41/16*

U.S. Cl. 74—867 4 Claims

1. A manual valve for an automatic transmission, comprising:

a valve body having a valve bore therein;

a plurality of forward running ports for delivering fluid for forward running of said transmission, a reverse running port for delivering fluid for reverse running of said transmission, and a single line pressure application port for supplying fluid at line pressure, all of said ports opening into said bore, and a drain opening out of said bore; and

a spool having recesses therein for connecting said ports to and disconnecting said ports from each other;

said reverse running port and said forward running ports and said drain all being positioned in the same axial direction along said valve bore from said single line pressure application port, and said forward running ports being along a peripheral portion of said valve bore which is substantially on the circumferentially opposite side of said valve bore from said reverse running port and said single line pressure application port; and

said spool having a reduced diameter portion forming a first fluid chamber connecting said single line pressure application port and said forward running ports in the various positions of said spool for forward running of said transmission, a second fluid chamber defining recess along a circumferential portion of said spool opposed to said single line pressure applying port and said reverse running port for connecting said reverse running port and said single line pressure application port in the reverse running position of said spool and connecting said reverse running port and said drain in the running positions of said spool, and a drain chamber defining recess along a circumferential portion of said spool opposed to said forward running ports for connecting said forward running ports to said drain in the positions of the spool other than positions in which the respective forward running ports are connected with said single line pressure application port through said first fluid chamber.

4,875,393

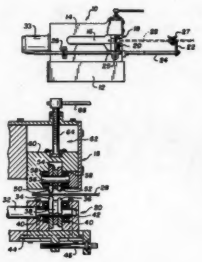
APPARATUS FOR TENSIONING AND DEFORMING SAW BLADES

Christopher Williams, South Burnaby, Canada, assignor to Williams & White Machine Shop, Burnaby, Canada

Filed May 2, 1989, Ser. No. 346,438

Int. Cl.[4] B23D *63/18*

U.S. Cl. 76—27 6 Claims



1. Apparatus for tensioning and deforming saw blades comprising:

Support means for supporting a saw blade and permitting movement of the saw blade in the face plane of the saw blade;

a first pair of rolls mounted for rotation on a single axle with a spacer therebetween, one roll having a larger diameter than the other roll, and both rolls having convex peripheral surfaces, the first pair of rolls positioned to engage one face of the saw blade;

a second pair of rolls, substantially the same in difference in diameter, width and spacing the first pair of rolls mounted for rotation on a single axle substantially parallel to the axle for the first pair of rolls, the second pair of rolls positioned to engage on the opposite face of the saw blade directly opposite the first pair of rolls;

means to move at least one of the axles for the first pair of rolls and the second pair of rolls axially relative to the saw blade and to each other, and

means to move at least one of the pairs of rolls perpendicular to the face of the saw blade to apply pressure to the saw blade between the first pair of rolls and the second pair of rolls.

4,875,394

CHAMPAGNE BOTTLE OPENER

Cleveland B. Crudgington, Jr., 222 N. Myrtle Ave., Monrovia, Calif. 91016

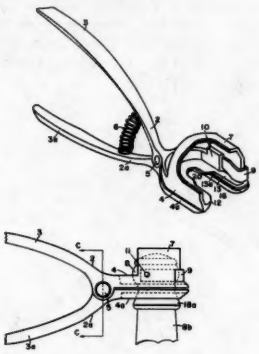
Continuation-in-part of Ser. No. 786,545, Oct. 11, 1985, abandoned. This application Jun. 19, 1986, Ser. No. 895,204

Int. Cl.[4] B67B *7/02*

U.S. Cl. 81—3.08 14 Claims

1. In an extractor for extracting a mushroom shaped stopper from the neck of a sparkling beverage bottle, there being an upwardly presented shoulder on said neck, there being a downwardly presented and openly accessible shoulder on said stopper, and said extractor comprising a pair of levers which are pivotally interconnected, each lever defining a handle at one end thereof and a bifurcated jaw having a first recess at the opposite end thereof, wherein one jaw is located above the other, and each of said jaws is adapted to encircle, at least partially, the bottle's neck, such that the lower jaw is adapted to make contact with said upwardly presented shoulder on at least two locations, and the upper jaw includes a stopper re-

taining means and is adapted to make contact with said downwardly presented shoulder on at least two locations, with said handles being spring-loaded and positioned relative to one another so that the squeezing together of said pair of handles results in the separation of said jaws, urging said lower jaw against said upwardly presented shoulder and urging said upper jaw against said downwardly presented shoulder, and with force sufficient to lift said stopper relative to said neck, the improvement which comprises:



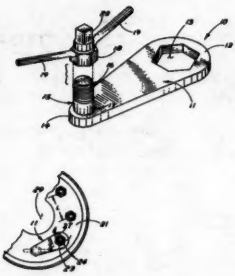
a generally U-shaped second recess within the interior of each of said bifurcated jaws wherein said extractor can be repositioned with both of said second recesses encircling, at least in part, the stem of a partially lifted stopper, thereby enabling said lower jaw to rest directly of top of said bottle and said upper jaw to gain increased accessibility to said stopper's downwardly presented shoulder means.

4,875,395

DUAL WHEEL LUG NUT TOOL

Isaac Alvarez, 3000 Airline Hwy., Hollister, Calif. 95023

Filed Aug. 10, 1988, Ser. No. 230,519
Int. Cl.[4] B25B *9/00*
U.S. Cl. 81—13 **6 Claims**



1. A dual wheel lug nut tool for securement of a first internally threaded lug nut relative to a second internally and externally threaded elongate lug nut to an automotive wheel rim wherein said wheel rim includes a plurality of radially spaced openings for receiving a plurality of said second nuts therethrough, said tool comprising

an elongate body including a top and bottom planar surface, and

a wrench opening means for securement of said first lug nut orthogonally directed through a first end of said body, and

an exteriorly threaded boss member orthogonally and integrally directed outwardly of the top surface of said elongate body, and

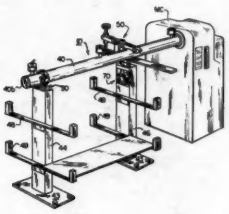
an interiorly threaded nut means formed with complementary threads relative to said boss member for selective threaded securement to said boss member.

4,875,396

APPARATUS FOR FEEDING BAR STOCK TO A MACHINING OPERATION

Thomas Gathings, 4094 Maple Ave., Burlington, N.C. 27215

Filed Mar. 21, 1988, Ser. No. 170,163
Int. Cl.[4] B23B *13/00*
U.S. Cl. 82—124 **6 Claims**



1. An apparatus for feeding bar stock to the automatic feed mechanism of a CNC machine center of the type which has a feed orifice through which bar stock is advanced to the cutting head and wherein said feed orifice has an inlet end through which the bar stock is inserted into the orifice, and an outlet end from which the bar stock leaves the feed orifice and enters the cutting head; said apparatus for feeding bar stock comprising:

(a) a first, internal stock retaining sleeve removably inserted within said feed orifice of the CNC machine center; said first retaining sleeve being comprised of:

(i) at least one master bushing for controlling the bar stock at a point immediately preceding, and as the stock enters, the cutting head; said master bushing having a generally tubular configuration and being positioned in said feed orifice at or near the cutting head; said master bushing having an outer diameter substantially equivalent to the inner diameter of said feed orifice, and an inner diameter substantially equivalent to the outer diameter of the bar stock being cut;

(ii) a prescribed length of rigid, tubular material mounted against and abutting one end of said master bushing such that said tubing extends from said master bushing to said inlet end of said feed orifice, and the opposite end of said bushing is adjacent said orifice outlet; said tubing having an inner diameter somewhat greater than the outer diameter of the bar stock to eliminate drag during the cutting operation;

(b) a second stock retaining sleeve supported exteriorly of the machine center for supplying bar stock to said feed orifice inlet; said second retaining sleeve being comprised of:

(i) at least two bushings having a tubular configuration and being connected in spaced relationship to each other by at least one cylindrical connecting tube;

(ii) each of said bushings having an inner diameter substantially equivalent to the outer diameter of the bar stock being cut, and said connecting tube shaving an inner diameter slightly greater than that of the bar stock so that the connecting tube abuts the ends of the bushings, to reduce drag during the turning and cutting operation;

(c) means for supporting said second retaining sleeve in abutting relationship to said feed orifice inlet, during use;

whereby the bar stock is fed through said second retaining

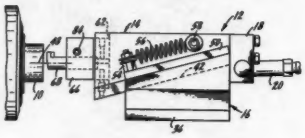
sleeve into said feed orifice, exiting through said orifice outlet to the cutting head; and whereby the turning and cutting speed is increased substantially due to elimination of vibration and whipping effect on the bar stock by the close fit of the stock within said bushings.

4,875,397

PRESET QUICK CHANGE TOOLING FOR A RECESS CUTTING ATTACHMENT

Boris Berdichevsky, Wilmette, Ill., assignor to Sloan Valve Co., Franklin Park, Ill.

Continuation of Ser. No. 124,176, Nov. 23, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 312,362
Int. Cl.[4] B23B *29/00*
U.S. Cl. 82—60 **3 Claims**



1. A recess attachment with preset quick change tooling for use on a multiple spindle automatic machine including:

a base formed and adapted to be mounted at a work station on an automatic machine, said base being movable in a defined direction during a machining operation and having a slide mounting surface in a plane forming a small acute angle with said direction of movement,

a slide positioned on said slide mounting surface, spring means attached to said base and slide and inhibiting relative movement therebetween, said slide having a nest with a pair of mutually perpendicular surfaces forming two slides thereof,

a tool holder removably positioned in said nest and firm against said mutually perpendicular surfaces, an adjustment member positioned on said tool holder and a cooperating stop on an additinal side of said slide nest, said tool holder having a tool receiving opening and means for fastening a cutting tool therein, said cutting tool being preset on said tool holder prior to the mounting of said tool holder in said nest,

clamping means mounted on said tool holder for holding said tool holder against said mutually perpendicular slide nest surfaces, said clamping means including a pair of differential screws adjustably mounted on said slide and having clamps threadedly mounted thereon, said tool holder having a cam surface cooperazting with said clamps, turning of said differential screws causing said tool holder to be urged simultaneously toward both of said mutually perpendicular surfaces,

said base and slide moving in unison to a precutting position, further movement of said base relative to said slide causing said slide and the cutting tool mounted thereon to move in a direction generally perpendicular to base movement to cut a recess in a workpiece.

4,875,398

RETRACTABLE DUST CONTROL HOOD AND GUARD FOR ROTARY TABLE SAW

James M. Taylor, Plano, and Gary M. Karner, Allen, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

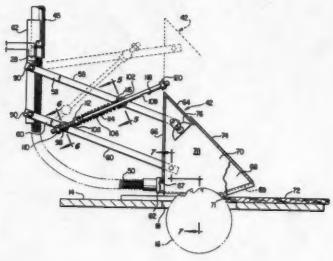
Filed Jan. 15, 1988, Ser. No. 144,349
Int. Cl.[4] B27G *19/02*; B27B *5/22*
U.S. Cl. 83—100 **9 Claims**

9. A dust control hood apparatus for a rotary table saw and the like, said table saw including a generally flat table support surface and a cutting blade extending from said support surface for engagement with a workpiece to be cut and supported on said support surface, said hood apparatus including:

a generally tubular support member disposed spaced from said support surface;

a dust control hood characterized by a generally box-like member having an open side facing said support surface and opposed walls defining an interior space for collecting and evacuating dust from the vicinity of said cutting blade;

flexible conduit means connected to said hood and to said support member for withdrawing air from said interior space with dust entrained therein for evacuating dust generated by said cutting blade during the operation of said cutting blade; and



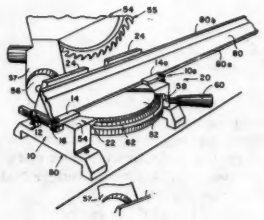
hood support means interconnected said hood and said support member comprising spaced apart pairs of parallelogram link members pivotally connected to said support member and to said hood at opposite ends of said link members, respectively, shaft means disposed between and connected to said link members of each pair, respectively, and said shaft means being spaced apart, elongated rod means extending between and connected to one of said shaft means and slidably supported by the other of said shaft means, and adjustable spring means disposed along said rod means and between said shaft means for urging said support means to counteract the weight of said hood when said hood is in a working position.

4,875,399

MITER BOX ATTACHMENT FOR CUTTING CROWN MOULDINGS AND THE LIKE

William D. Scott, 10795 Dalzell, Traverse City, Mich. 49684, and James J. Swartout, 5663 County Rd. 616 E., Cedar, Mich. 49621

Filed Jun. 23, 1988, Ser. No. 210,571
Int. Cl.[4] B27B *27/06*; B23Q *3/00*
U.S. Cl. 83—468.3 **16 Claims**



1. A motorized miter box for cutting compound miters comprising:

a horizontal table having a planar surface for supporting a workpiece;

a fence extending upwardly from said table to provide a registration surface for a workpiece supported on said table;

a saw for cutting a workpiece supported on said table and registered against said fence;

a pair of jigs mounted at opposite edge portions of said table, each of said jigs including a body and a registration block pivotally secured to said body, said body being located below said upper surface of said table, said registration block being pivotable between a storage position wherein said registration block is also located below said upper surface of said table and an operative position wherein said registration block rests on said upper surface to define a distance between said registration block and said fence so that a workpiece can be held in cocked position between said registration block and said fence; and

mounting means for mounting each of said jig bodies below said upper surface of said table, said mounting means permitting relative movement between said jig body and said table so that said registration block can be moved toward and away from said fence, whereby the distance between said registration blocks and said fence is adjustable.

4,875,400

ELECTRONIC MUSICAL INSTRUMENT WITH TOUCH RESPONSE FUNCTION

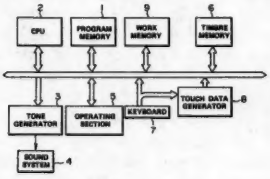
Hiroko Okuda, and Makoto Takenaka, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 26, 1988, Ser. No. 199,116

Claims priority, application Japan, May 29, 1987, 62-82620[U]; May 29, 1987, 62-82622[U]; May 29, 1987, 62-82624[U]

Int. Cl.[4] G10H *1/053, 1/18*

U.S. Cl. 84—626 **9 Claims**



1. An electronic musical instrument with a touch response function for synthesizing a plurality of tone waveform data from a plurality of tone waveform generating means for generation of musical tone, said instrument comprising;

manually operating means for generating a touch state when it is operated manually;

touch data preparing means for detecting the touch state of said manually operating means to generate touch data;

touch response data preparing means for preparing a plurality of touch response data based on said touch data;

designation means for enabling a player of the electronic musical instrument to designate one of said plurality of touch response data for each of said plurality of tone waveform generating means; and

weighting means for weighting said tone waveform data obtained from each of said plurality of tone waveform generating means in response to the respective designated one of said plurality of touch response data.

4,875,401

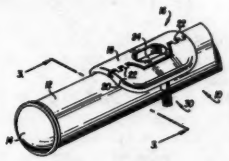
MOUTHPIECE PLATES OF FLUTE-TYPE WIND INSTRUMENTS

J. Charles Culbreath, 2008 Cloverdale Ave., Winston-Salem, N.C. 27103

Filed Aug. 31, 1988, Ser. No. 238,469

Int. Cl.[4] G10D *7/02*

U.S. Cl. 84—384 **16 Claims**



1. In a musical instrument of the flute-type comprising a headjoint with a longitudinal axis, said headjoint having a blow hole and an arcuate mouthpiece plate surrounding said blow hole, the improvement comprising at least a portion of said mouthpiece plate being movable relative to said headjoint and means connected between said headjoint and the movable portion of said mouthpiece plate for adjusting the position of said movable portion whereby adjustment of said movable portion aids the user of said instrument to establish optimum embouchure.

4,875,402

RECOIL BRAKE FOR A GUN HAVING A HEAT EQUALIZATION AND INDICATION DEVICE

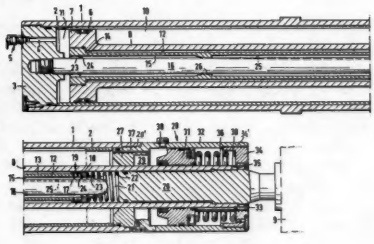
Josef Metz, Neuss, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,007

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728532

Int. Cl.[4] F41F *19/02*; F16F *9/10*

U.S. Cl. 89—43.01 **5 Claims**



1. In a recoil brake for a gun, including

a brake cylinder adapted to be filled with hydraulic fluid and having opposite first and second ends;

a piston slidably received in the brake cylinder; said piston separating an inner volume of said brake cylinder into a brake chamber and an equalizing chamber;

a piston rod affixed to said piston and extending axially through said brake chamber towards said second end and being arranged for connection to a breechblock of the gun at said second end;

a first throttle passage maintaining hydraulic communication between said brake chamber and said equalizing chamber for effecting a throttled flow of hydraulic fluid therebetween upon movement of the piston; and

a heat equalization and indication device having a heat

equalization chamber; means defining a second throttle passage maintaining hydraulic communication between said brake chamber and said heat equalization chamber; a heat equalization piston slidably disposed in said heat equalization chamber and being exposed to a pressure of hydraulic fluid situated in the heat equalization chamber and a spring connected to the great equalization piston for urging said heat equalization piston into said heat equalization chamber; and an indicator element coupled with said heat equalization piston;

the improvement wherein

said heat equalization and indication device is a self-contained, modular unit releasably connected to said second end of said brake cylinder and forming an axial extension thereof; said heat equalization and indication device further comprising an impact plate bounding said heat equalization chamber in said heat equalization device and said brake chamber in said brake cylinder; said second throttle passage being provided in said impact plate.

4,875,403

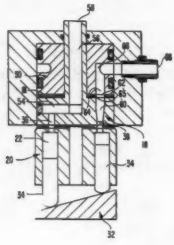
VARIABLE DISPLACEMENT PORT PLATE

Mark S. Stroze, and Richard W. Reynolds, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 18, 1988, Ser. No. 259,322

Int. Cl.[4] F04B *1/30*

U.S. Cl. 91—482 **14 Claims**



1. A hydraulic apparatus comprising:

(a) a rotatable cylinder block having a plurality of cylinders with each cylinder containing a piston which reciprocates in the cylinder to define a volume which is filled with hydraulic fluid as the piston reciprocates in conjunction with rotation of the block;

(b) a port plate having a body with a first surface which rotatably engages the cylinder block and a second surface which rotatably engages a fixed surface, the first surface having a high pressure arcuate port and a low pressure arcuate port with each port being radially disposed with respect to a center of the body and the ports being separated by a pair of arcs, the ports intercepting openings of the cylinders as the cylinder block rotates, the body being rotatable in first and second directions to vary a volume of hydraulic fluid taken into the cylinders from a minimum through a maximum for rotation in either direction with a maximum angle subtended by rotation in either direction being greater than an angle subtended by the high pressure arcuate port; and

(c) a first passage extending through the port plate from the high pressure arcuate port to a second arcuate port in the second surface which faces the fixed surface and which subtends an angle defined with respect to the center of the body at least as large as the maximum angle and is in fluid communication with a port in the fixed surface of the port plate throughout an angle as least as large as the maximum angle.

4,875,404

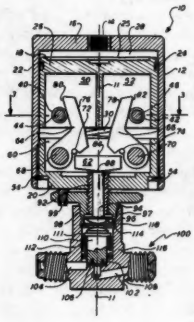
COMPACT FLUID POWERED ACTUATOR

Lewis L. Aldridge, Morris Plains, N.J., assignor to Ewal Manufacturing Co., Inc., Belleville, N.J.

Filed Jul. 5, 1988, Ser. No. 215,776

Int. Cl.[4] F01B *9/00*

U.S. Cl. 92—130 A **13 Claims**



1. A fluid actuator comprising:

a cylindrical housing having a base;

a piston slideably mounted in said housing and defining a fluid chamber;

means for permitting pressurized fluid to be applied to said chamber;

a stored-energy element mounted in said housing between said piston and said base, said element having an increase in energy storage when fluid pressure in said fluid chamber moves said piston toward said base and having a reduction in energy storage and forcing said piston to move away from said base when fluid pressure in said fluid chamber is reduced;

an output shaft having one end slideably extending from said housing through said base;

a lever pivotally mounted on said base and having a first arm and a second arm shorter than said first arm; and

means coupling said first arm to said piston and said second arm to another end of said output shaft for forceably moving said shaft in a direction toward said one end in response to movements of said piston away from said base.

4,875,405

SEALING DEVICE

Bruno Bernhardt, Reutlingen, and Heinrich Kedzierski, Wennigsen, both of Fed. Rep. of Germany, assignors to WABCO Westinghouse Steuerungstechnik GmbH, Hanover, Fed. Rep. of Germany

Filed Jul. 15, 1987, Ser. No. 73,592

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1986, 3623928

Int. Cl.[4] F16J *1/06*

U.S. Cl. 92—194 **24 Claims**

1. A sealing apparatus for sealing two longitudinal extending machine components which can slide relative to and against one another longitudinally, a first of such two machine components having a sliding surface along which a second of such two machine components slides longitudinally to define a sliding motion, said sealing apparatus comprising:

(a) a plastic sealing element having low friction and relatively low elasticity secured to said second machine component;

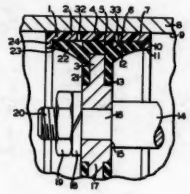
(b) an elastic support member positioned intermediate said plastic sealing element and said second machine component to exert a force on at least a portion of said plastic sealing element which slides along said sliding surface of

said first machine component and to provide support for said plastic sealing element, said elastic support member having an elasticity in cross-section at least in a plane perpendicular to said sliding surface on said first machine component;

(c) at least a portion of said plastic sealing element which slides along said sliding surface on said first machine component encircles said elastic support member in a direction of said sliding motion;

(d) mounting protrusions integral with and extending from said plastic sealing element and extending in cross-section in a plane substantially perpendicular to said sliding surface on said first machine component to engage corresponding support surfaces of said elastic support member, said corresponding support surfaces are oriented in cross-section in a plane substantially perpendicular to said mounting protrusions;

(e) an outer dimension of said corresponding support surfaces, measured in a direction of said sliding motion, is greater than a distance between said mounting protrusions



of said plastic sealing element when said plastic sealing element and said elastic support member are in an unmounted condition;

(f) said portion of said plastic sealing element, which slides along said sliding surface on said first machine component, includes a predetermined prestress exerted by said corresponding support surfaces on said mounting protrusions in the direction of said sliding motion of said sliding surface, on said first machine component at least in an area of said mounting protrusions; and

(g) said elastic support member includes sleeve-shaped protrusions extending substantially in said direction of said sliding motion and carrying said plastic sealing element and an end of each sleeve-shaped protrusion forming a respective support surface of said elastic support member and said elastic suppport member further includes a means positioned to engage adjacent each end of said sleeve-shaped protrusions and said second machine component for providing elastic cushioning for said sleeve-shaped protrusions.

4,875,406

DEVICE FOR DETECTING DIFFERENT POLLUTANTS IN GAS STREAMS

Heinz Hölter, Beisenstrasse 39–41, 4390 Gladbeck; Heinrich Igelbüscher, Gladbeck; Heinrich Gresch, Dortmund-Wickede; Heribert Dewert, Gladbeck, and Peter Burggräf, Bochum, all of Fed. Rep. of Germany, assignors to Heinz Hölter, Gladbeck, Fed. Rep. of Germany

PCT No. PCT/EP87/00411, § 371 Date Mar. 25, 1988, § 102(e) Date Mar. 25, 1988, PCT Pub. No. WO88/01057, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 29, 1987, Ser. No. 177,549

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626277; Nov. 28, 1986, 3640734

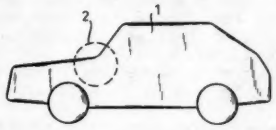
Int. Cl.[4] B60H *1/28*

U.S. Cl. 98—2.01 **4 Claims**

1. A device for the detection of various pollutants in a gas stream supplied to motor vehicle cabins or operator protection cabins comprising:

at least one semiconductor gas sensor;

a means for alternately exposing said gas stream to be evaluated to said sensor; and



a microprocessor functioning to correct, with the aid of a correction factor, pollutant values measured by said semiconductor gas sensor, said correction factor being related to an average value of temperature and humidity.

4,875,407

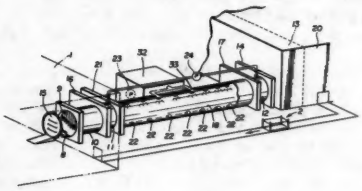
STERILIZING METHOD FOR TREATMENT OF FRESH FRUITS AND APPARATUS USED FOR THE METHOD

Jitsuo Inagaki, 71, Kamiyashiki, Oaza Itsusiki, Itsusikicho,, Hazugun, Aichi, Japan

Division of Ser. No. 214,513, Jul. 1, 1988. This application Dec. 30, 1988, Ser. No. 292,302

Int. Cl.[4] A23L *3/00, 3/26*

U.S. Cl. 99—451 **3 Claims**



1. An apparatus for conducting a sterilizing treatment of fresh fruit, said apparatus comprising a far infrared irradiation chamber containing and a curved heat radiation surface, means for transferring fruit from said irradiation chamber to a saturated steam chamber, said saturated steam chamber maintaining the far infrared irradiated fruit at a predetermined temperature for a predetermined period of time, a mechanism for reducing pressure of said saturated steam chamber, a nozzle for introducing steam in a steam jet into said steam chamber, and means for controlling said steam jet by automatically opening the nozzle when the temperature of said steam chamber has fallen under a predetermined level or when the pressure of the steam chamber has fallen under the saturated steam pressure.

4,875,408

BEVERAGE MAKER FOR USE IN AUTOMOTIVE VEHICLES

Frank C. McGee, 1930 Port Dunleigh, Newport Beach, Calif. 92660

Filed Feb. 27, 1989, Ser. No. 315,828

Int. Cl.[4] A47J *31/00*

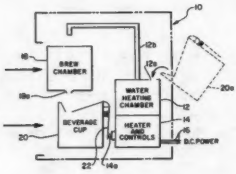
U.S. Cl. 99—283 **11 Claims**

1. In a beverage maker system for installation and use in automotive vehicles including: a water heating chamber including means for receiving a quantity of water; means for heating said water chamber and the water contained therein; a beverage-brewing chamber including beverage making material in a quantity sufficient when acted upon by hot water to make one cup of hot beverage and aperture means for dispens-

ing hot beverage from said chamber; conduit means for directing the flow of heated water from said water chamber to said beverage-brewing chamber; means for initiating and controlling the heating of water in said water chamber to a predetermined temperature and for controlling the flow of heated water through said conduit means to said beverage-brewing chamber; and a beverage drinking cup positionable within said beverage maker system for receiving hot beverage dispensed from the beverage-brewing chamber, an improved beverage-brewing chamber comprising:

(a) an upper brewing chamber area for receiving heated water from the water heater chamber via said conduit means;

(b) a disposable brew basket within a lower brewing chamber area, said brew basket including a central top opening for receiving heated water from said upper chamber, a bottom wall having a multiplicity of fluid flow perforations, and a filter-like pouch located within said brew



basket and containing said beverage making material, the bottom wall of said brew basket includes closure means for seating in and closing the aperture means for dispensing hot beverage from the beverage-brewing chamber; and

(c) shape-memory alloy members of initially reduced height located within said lower brewing chamber area below said brew basket, positioned around the closure means of said brew basket, and in contact with the bottom wall thereof, said shape-memory members being expandable in height upon being heated to a predetermined temperature by hot beverage flowing from the fluid flow perforations in the bottom wall of said brew basket whereby said bottom wall is lifted by said members and the closure means thereof is unseated from the aperture means of said beverage-brewing chamber thereby permitting the flow of hot beverage from said chamber to said beverage drinking cup.

4,875,409

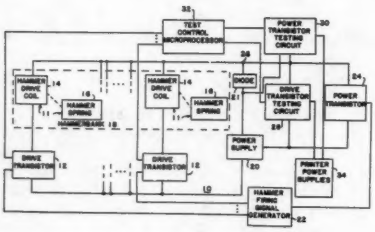
MAGNETIC PRINT HAMMER ACTUATOR PROTECTION CIRCUIT

David C. Condon, Mission Viejo, and David M. Stumfall, Santa Ana, both of Calif., assignors to Printronix, Inc., Irvine, Calif.

Filed Jul. 1, 1987, Ser. No. 68,345

Int. Cl.[4] B41J *9/38*

U.S. Cl. 101—93.29 **14 Claims**



1. In a printer having a common power transistor, a circuit for detecting a failure condition of the common power transistor comprising means for sensing conductivity of the common power transistor and means for signaling a failure condition when the common power transistor is switched off and at the same time begins to conduct at a level signifying abnormal operation, the printer including a plurality of drive transistors for driving a plurality of print hammer actuators and the common power transistor being coupled to provide rapid current rise in each of the drive transistors when the drive transistors are switched on.

4,875,410

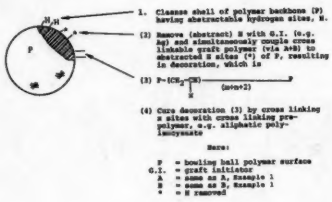
DECORATING BOWLING BALLS

Andrew J. Lee, Hopkinsville, Ky.; Mohan L. Sanduja, Flushing, N.Y.; Kenneth Sugathan, Piscataway, N.J.; Felicia Dragnea, Forest Hills, and Carl Horowitz, Brooklyn, both of N.Y., assignors to Ebonite International, Inc., Hopkinsville, Ky.

Filed Jan. 25, 1988, Ser. No. 148,002

Int. Cl.[4] B41F *17/00*; B41M *1/10*; B44C *1/16*; B05D *3/12*

U.S. Cl. 101—170 **2 Claims**


1. Cleaves shell of polymer backbone (P) having abstractable hydrogen sites, H.
(2) Remove (abstract) H with G.I. (e.g. Ag) and simultaneously couple cross linkable graft polymer (via A•B) to abstracted H sites (*) of P, resulting in decoration, which is
(3) P-[CR2-CR]-
(non-2)
(4) Cure decoration (3) by cross linking A sites with cross linking pre-polymer, e.g. aliphatic poly-isocyanate
Here:
P = bowling ball polymer surface
G.I. = graft initiator
A = same as A, Example 1
B = same as B, Example 1
* = H removed

2. A method of decorating a bowling ball, the ball having an outer shell selected from the group consisting of rubber, polyester and polyurethane each presenting in its molecular structure active hydrogens capable of undergoing abstraction for graft polymerization at vacated hydrogen sites, comprising the steps of:

(I) applying to a plate, having the decoration for the ball, a polymeric decorating composition which will graft to the surface of the ball and comprising parts A, B and C;

part A containing a graft monomer with cross-linkable sites and a graft prepolymer with cross-linkable sites in a solvent therefor;

part B containing a cross-linker and solvent therefor for cross-linking said cross-linkable sites;

part C containing a graft initiator in the form of metal ions to abstract said active hydrogen sites and transform the abstracted sites into free radical sites to which the monomer and prepolymer of part A couple covalently in a monomer-prepolymer chain;

(II) lifting the decoration composition, in decorative form, from the plate and transferring the so lifted decoration to the ball; and

(III) exposing the ball bearing the transferred decoration to infrared or ultraviolet light to complete cross-linking, cure and graft bonding of the decoration resulting in a (1) cross-linked graft polymer which is (2) covalently coupled by graft polymerization to said free radical sites.

4,875,411

RANDOM LOTTO MARKER

Lanny Turner, 72 Bedford St., New York, N.Y. 10014

Continuation of Ser. No. 229,562, Aug. 5, 1988, abandoned. This application Mar. 16, 1989, Ser. No. 325,076

Int. Cl.[4] B41K *1/42*

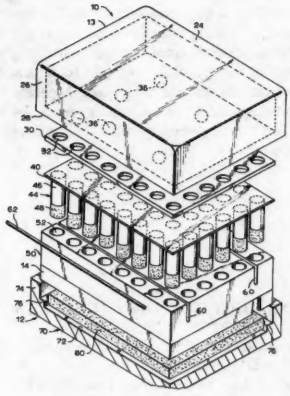
U.S. Cl. 101—333 **22 Claims**

1. Portable hand-operated mechanical apparatus for making a random wager selection, comprising:

(A) means for generating a substantially random first pat-

tern, said generating means including a cage, cage-biasing means, and a plurality of balls, said cage being moveable between a vertically extended normal configuration enabling random horizontal movement of said balls within said cage and a vertically collapsed printing configuration fixing said balls against horizontal movement within said cage and forcing said balls downwardly, said cage-biasing means biasing said cage to its vertically extended normal configuration and thereby permitting said balls to assume the first pattern after said cage is randomly shaken; and

(B) means for marking a wagering sheet with printing in a second pattern essentially the same as said first pattern and constituting a wager selection, said marking means including a plurality of independently selectable marking elements independently moveable between inoperative and operative positions and element-biasing means, said marking elements in said inoperative position being longitudinally elevated and said marking elements in said operative position being longitudinally depressed, said element-biasing means biasing said marking elements to their inoperative position;



said apparatus additionally including a downwardly extending lip for maintaining said marking elements in said inoperative position spaced above the sheet while enabling said marking elements in said operative position to engage the sheet; whereby downward movement of said balls as a result of the movement of said cage to its vertically collapsed printing configuration operatively vertically depresses the marking elements vertically aligned with said balls to their operative positions, a vertical alignment of one of said balls and one of said marking elements being required for said one marking element to mark the sheet.

4,875,412

PRINTING PRESS BLANKET CLEANER

Norman D. Wright, 101 Cardinal Dr., Belleville, Ill. 62221; Gary C. Glanzner, 5083 Towne Center Dr., St. Louis, Mo. 63128, and John A. Signorelli, 12334 E. Inlet Ridge, Maryland Heights, Mo. 63043

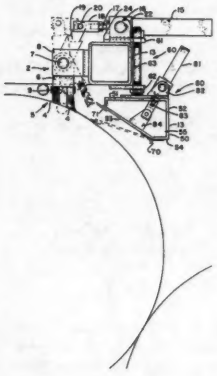
Filed May 20, 1988, Ser. No. 197,036

The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl.[4] B41L *41/00*; A47L *13/52*

U.S. Cl. 101—425 **10 Claims**

1. In an offset printing press having a blanket cylinder adapted to rotate about a longitudinal axis, the improvement which comprises a dry mechanical blanket cleaner system for removing dust and lint from said blanket cylinder during an uninterrupted course of a press run, said blanket cleaner system including a normally non-rotating brush means operatively mounted to said press, said brush means including at least one brush mounted for movement between at least a first position where said brush is in contact with said blanket cylinder and second position where said brush is remote from said blanket cylinder, means for moving said brush between said first and said second positions; means for mounting said brush to said



press including means for adjusting the position of said brush with respect to said blanket cylinder; and means for receiving and automatically removing debris from said brush when said brush is moved to said second position, said last mentioned means including vacuum means for receiving debris from said brush.

4,875,413

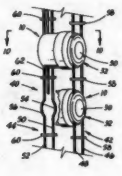
APPARATUS FOR PERFORATING WELLS

Glenn B. Christopher, Ft. Worth, and Jerry D. Motley, Arlington, both of Tex., assignors to Jet Research Center, Inc., Mansfield, Tex.

Filed Nov. 30, 1988, Ser. No. 278,695

Int. Cl.[4] F42B *1/02*; E21B *43/119*

U.S. Cl. 102—307 **20 Claims**



1. Apparatus for perforating a subterranean formation penetrated by a well bore comprising:

a shaped charge having a discharge end and an ignition end, the ignition end including an extension providing cavities for containing opposed portions of a pair of wires of a wire carrier and a passage for connecting detonation initiating means thereto;

a cap sealingly attached to said shaped charge over the discharge end thereof, said cap including a threaded extension whereby said cap and shaped charge can optionally be threadedly attached to a complementary threaded opening in a metal strip carrier and held at a desired position within said well bore thereby; and

a wire carrier adapter nut threadedly attached to said threaded cap extension, said adapter nut providing cavities for containing opposed portions of an additional pair

of wires whereby said cap and said shaped charge can be attached to a four-wire carrier and held at a desired position within said well bore thereby.

4,875,414

EXPLOSIVE CHARGE WITH A PROJECTILE-FORMING METALLIC INSERT

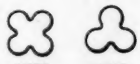
Hanajörg Stadler, Rückersdorf, and Klaus von Laar, Lauf, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Feb. 3, 1988, Ser. No. 151,713

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705381

Int. Cl.[4] F42B *1/00*

U.S. Cl. 102—307 **7 Claims**



1. Explosive charge with a projectile-forming metallic insert, said insert essentially having the shape of a spherically-curved dish, said insert being a body constituted from a single-crystal possessing an orientation of the crystal axes in a prescribed direction, said orientation being selected from the group consisting of [100] and [111] as shown in FIG. 3.

4,875,415

ROTARY JACK ASSEMBLY FOR A CRANE

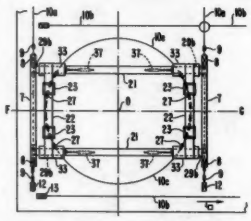
Heki Kasugai, Kobe, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 888,434, Jul. 23, 1986, abandoned. This application Jun. 29, 1988, Ser. No. 213,473

Claims priority, application Japan, Oct. 28, 1985, 60-164104

Int. Cl.[4] B61J *1/02*; B61B *13/12*

U.S. Cl. 104—35 **2 Claims**



1. A rotaory jack assembly for supporting a crane comprising:

a substantially horizontal frame assembly, said frame assembly including a first and a second pair of elongated spaced opposed substantially parallel frames, saidi first and second pairs of frames being substantially perpendicular to each other and intersecting each other at respective fixed intersections, said first pair of frames being an upper pair of frames, said second pair of frames being a lower pair of frames, and said second pair of frames being disposed below said first pair of frames and being fixedly attached to said first pair of frames at said fixed intersections, and;

a plurality of wheel frames for supporting said frame assembly being attached to the underside of each one of opposed frames of said first pair of said first and second pairs of frames, and each one of said plurality of wheel frames being spaced from each one of said fixed intersections of said first and second pairs of frames;

means for vertically shifting said frame assembly relative to said plurality of wheel frames, said means for vertically shifting being attached to each of said plurality of wheel frames, and said means for vertically shifting being attached to said frame assembly on said first pair of frames;

a plurality of crane supporting arms for supporting a crane thereon, said plurality of crane supporting arms being located at opposite ends of said frame assembly, and being relatively movable to said frame assembly;

means for attaching said plurality of crane supporting arms to said frame assembly on said second pair of said first and second pairs of frames to which said plurality of wheel frames is not attached, and for horizontally shifting each arm of said plurality of crane supporting arms outwardly of said frame assembly, said means for attaching and horizontally shifting being attached to each said crane supporting arm, and said means for attaching and horizontally shifting being separate from and horizontally spaced from said means for vertically shifting said frame assembly; and

each said crane supporting arm being separate from and horizontally spaced from each said means for vertically shifting said frame assembly relative to said plurality of wheel frames.

4,875,416

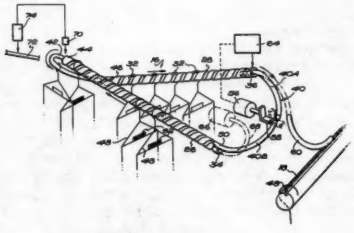
ENDLESS PATH STORAGE CAROUSEL WITH SELECTIVE DISCHARGE

Edward Duce, West Yorkshire, England, assignor to Stockrail Ltd., West Yorkshire, England

Filed Jan. 19, 1988, Ser. No. 145,360

Int. Cl.[4] B61B *13/00*

U.S. Cl. 104—167 **8 Claims**



1. A live storage carousel comprising:

(a) means defining an endless path along which suspension hangers are supported and moved,

(b) a scroll conveyor forming part of said endless path and having an upper end and a lower end,

(c) means for driving the carousel so that the hangers are driven from the lower end to the upper end of said scroll conveyor,

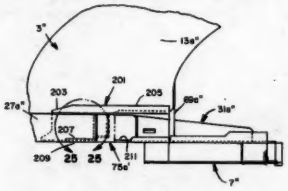
(d) gravity return means forming part of said endless path and extending from said upper end of said scroll conveyor, and

(e) selectively operable discharge means forming part of said gravity return means for selectively discharging said hangers out of the endless path and from the carousel dependent upon the operation of said discharge means as the hangers travel on said gravity return means.

4,875,417
END STRUCTURE FOR RAILWAY CAR

John W. Coulborn, St. Louis County, and John A. Krug, St. Charles County, both of Mo., assignors to ACF Industries, Incorporated, Earth City, Mo.

Continuation-in-part of Ser. No. 792,215, Oct. 28, 1985, Pat. No. 4,696,238. This application Aug. 21, 1987, Ser. No. 87,781
Int. Cl.[4] B61D *7/00, 17/00*
U.S. Cl. 105—248 5 Claims



1. In an end structure for a railway car, said railway car having a car body, the latter having side sheets, said end structure comprising a center stub still located generally along the longitudinal centerline of the railway car, a side sill at each side of the car extending longitudinally thereof along both sides of the car body in spaced transverse relation to center stub sill for carrying longitudinal loads from one end of the car to the other, and a side sill extension extending diagonally between an end of a respective said side sill and said center stub sill for carrying substantially all of the horizontal, longitudinal loads between said side sill and said center sub sill, wherein the improvement comprises: a connector casting between the outer end of the side sill and the inner end of the side sill extension, each of said side sills having a cutout in the lower portion thereof adjacent the outer ends of the side sill, said cutout being of sufficient size so as to facilitate welding of the inner surfaces of the side sills to the side sheets and of the side sill to said connector casting.

4,875,418
SET OF COMPONENTS FOR CONSTRUCTING FURNITURE PIECES

Ernst Moeckl, Stuttgart; Jörg Stumpf, Wernau; Walter Hardt, Paderborn, and Hermann Dölnghaus, Delbrück, all of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Continuation of Ser. No. 23,435, Mar. 9, 1987, abandoned. This application Oct. 14, 1988, Ser. No. 258,078
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1986, 8606663; Oct. 16, 1986, 3635108
Int. Cl.[4] A47B *35/00*
U.S. Cl. 108—50 13 Claims

1. A construction set for furniture pieces, said construction set comprising:

a connecting element having a longitudinal axis;

a first part and a second part, each of said first and second parts having inner and outer faces;

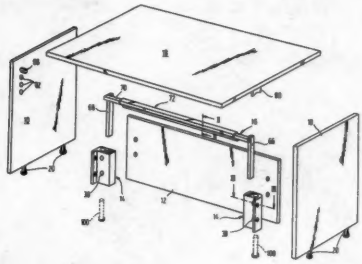
said connecting element being constructed as to be connected in a predetermined arrangement to said first and to said second parts along each of said first and second part inner faces to hold said first and second parts in assembly with one another and with said connecting element;

said first part when said connecting element is connected to said first and second parts in said predetermined arrangement being spaced from said inner surface of said second part to define a slot therebetween and portions of said inner face of said first and second parts together with a portion of said connecting element defining a channel extending along said longitudinal axis and communicating with said slot;

said channel being accessible from the outer faces of each of said first and second parts to allow a cable to be placed into said channel by moving such cable laterally of itself from a position in front of said outer faces to a position behind said inner faces of said first and second parts;

said connecting element being a corner connecting element with two flanges each containing flat fastening faces extending parallel to said longitudinal axis of said connecting element and arranged at an angle to one another;

said first and second parts are respectively connected adjacent their said inner faces to said fastening faces of said connecting element;



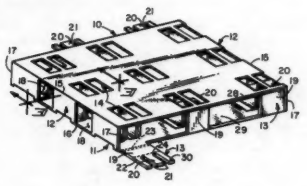
said two fastening faces each terminating short of an intersection line of two planes containing said two fastening faces

said connecting element, said first and said second parts when said two parts are connected to said connecting element forming said channel which channel is defined by portions of said inner faces of said first and second parts located between said termination of each fastening face and said intersection line and by said portion of said connecting element.

4,875,419
COLLAPSIBLE PAPERBOARD PALLET

Catherine Helton, and Tim Wright, both of P.O. Box 1407, Pasco, Wash. 99301

Filed Sep. 19, 1988, Ser. No. 245,575
Int. Cl.[4] B65D *19/12*
U.S. Cl. 108—56.1 9 Claims



1. A foldably collapsible pallet comprising, in combination:

planar horizontal top and bottom members foldably joined at adjacent opposed side edges by side elements, all said foldably joined edges being linear and parallel;

a plurality of similar pillar tabs defined in the top and bottom members, each pillar tab having one edge foldably interconnected to the element defining it, with all said foldable edges being parallel to the foldably joined edges of the top and bottom members,

said tabs arrayed in paired opposed sets in the top and bottom members so that one pillar tab, when extended inwardly, fits in surface adjacency with the other pillar tab of its set when extended inwardly, each pillar tab set being

mechanically interconnected with its tabs in surface adjacency and each pillar set being parallel to all other pillar sets; and

fastening means for releasably maintaining the pallet in an erected rectilinear mode.

4,875,420

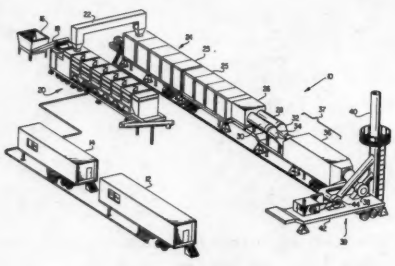
MOBILE HAZARDOUS WASTE TREATMENT SYSTEM

George H. Hay, Dallas, and Jeffrey P. Bleke, Arlington, both of Tex., assignors to Infrared Waste Technology, Inc., San Francisco, Calif.

Continuation of Ser. No. 93,295, Sep. 4, 1987, abandoned. This application Jul. 20, 1988, Ser. No. 222,323

Int. Cl.[4] F23G *7/00*

U.S. Cl. 110—215 **14 Claims**



1. A mobile waste treatment system, comprising:

a primary combustion chamber for receiving and burning waste material, said primary combustion chamber independently mounting on a first road transportable unit;

a secondary combustion chamber for further burning said waste material, said second combustion chamber interconnectable with said primary combustion chamber, said second combustion chamber independently mounted on a second road transportable unit; and

a scrubber section for finally processing said waste material, said scrubber section interconnectable with said secondary combustion chamber, said scrubber section independently mounted on a third road transportable unit;

said first, second, and third road transportable units each comprising a trailer having a skid section:

wherein said first road transportable unit trailer further comprises a support structure for supporting said primary combustion chamber on said skid section, said support structure fixably attached to said skid section and adjustably attached to said primary combustion chamber.

4,875,421

SEEDING IMPLEMENT WITH A COMBINATION TRANSPORT-DRIVE WHEEL

Howard C. Hadley, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Mar. 25, 1988, Ser. No. 172,825

Int. Cl.[4] A01C *19/04*

U.S. Cl. 111—200 **13 Claims**

1. A seeding implement adapted to be towed forwardly over the ground, comprising:

a main frame extending transversely to the forward direction and having outermost ends;

a material hopper supported by the main frame;

first and second trailing ground-engaging wheels;

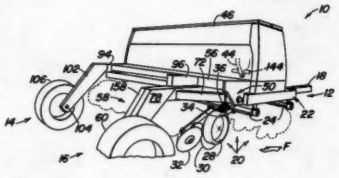
means for supporting the main frame on the wheels, including means for connecting the wheels to the main frame in trailing relationship to the main frame inwardly of the outermost ends;

tool assemblies connected to the main frame and movable with respect thereto between downwardly biased ground-engaging positions and upper transport positions;

drivable metering structure for metering material from the hopper to the tool assemblies;

meter drive structure operably connecting the metering structure and the first ground-engaging wheel for driving the metering structure at a rate proportional to the forward speed of the implement;

wherein said means for connecting the wheels to the main frame includes means for fixedly supporting the second wheel at a preselected vertical location relative to the main frame, a fore-and-aft extending wheel frame, means



pivotally connecting the forward end of the wheel frame to the main frame for free rocking of the wheel frame relative to the main frame and the second wheel about a first axis extending transversely to the forward direction, means rotatably supporting the first wheel from the aft end of the wheel frame, said wheel frame freely rockable about the first axis from an uppermost transport position to a range of field-working positions below the transport position to maintain contact between the first wheel and the ground at all times when the tool assemblies are in the ground-engaging position to thereby provide consistent drive from the first wheel to the metering structure.

4,875,422

REDUCED HEIGHT SEWING MACHINE WITH A ARCUATELY SWINGING NEEDLE BAR ARM

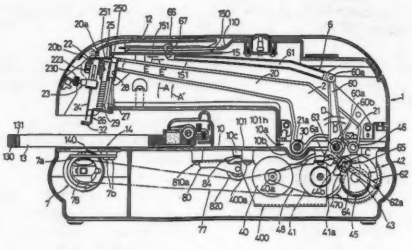
Hitoshi Ishikawa, Nishio, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed May 6, 1988, Ser. No. 191,005

Claims priority, application Japan, May 15, 1987, 62-119879; May 16, 1987, 62-119267

Int. Cl.[4] D05B *3/02, 1/00*

U.S. Cl. 112—258 **8 Claims**



1. A sewing machine comprising:

a bed housing having a needle penetrating hole at one end thereof;

an arm housing rising from the other end of said bed housing and extending to said one end of said bed housing over said bed housing;

a needle bar arm rotatably held in said arm housing and having a needle at a front end thereof;

a swing shaft in said bed housing for rotatably holding said needle bar arm disposed in a substantially horizonal direction, an axis of said swing shaft being disposed at a height substantially identical with a height of a top surface of a throat plate having a needle penetrating hole and held on said bed housing; and

a drive unit for swinging said needle bar arm with respect to the bed housing, said drive unit being accommodated in said bed housing.

4,875,423

OVEREDGE STITCH SEAM

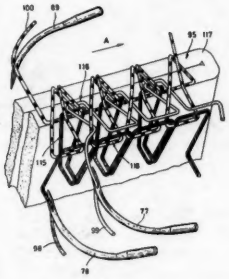
Roberto Conti, Milan, Italy, assignor to Conti Complett S.P.A., Italy

Filed Jul. 21, 1987, Ser. No. 76,163

Claims priority, application Italy, Jul. 28, 1986, 21280 A/86

Int. Cl.⁴ D05B *93/00*

U.S. Cl. 112—438 **5 Claims**



1. An overedge stitch seam, comprising:

a workpiece having a edge, a needle entry side and a needle exit side;

first and second needle threads entering said workpiece at distinct needle thread entry points on said needle entry side and formed into first and second loops arranged within said workpiece at a distance from said edge; and

a looper thread formed into third loops, said first and second loops being formed together and always passing together through said third loops, said third loops arranged at said needle entry side being oriented transversely relative to said edge, each of said first and second loops extending from said needle exit side and interlooping with one of said third loops extending to downstream needle thread entry points at said needle entry side, said needle thread entry points and said first and second loops starting therefrom being staggered relative to each other parallel to said edge;

whereby each of said third loops receiving said first and second loops is fixed to said workpiece by one of said first and second loops if the other of said first and second loops is broken.

4,875,424

SAILBOARD CONSTRUCTION

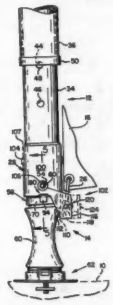
Donald C. Baldwin, Hood River, Oreg., assignor to Gorge Technology, Inc., Hood River, Oreg.

Division of Ser. No. 98,708, Sep. 18, 1987, Pat. No. 4,774,901, which is a continuation of Ser. No. 827,242, Feb. 6, 1986, abandoned. This application Apr. 11, 1988, Ser. No. 180,336

Int. Cl.⁴ B63H *9/08*; B63B *35/82*

U.S. Cl. 114—39.2 **9 Claims**

1. In a sailboard which includes a first member which is releasably secured to a second member so as to assemble the sailboard for use, the first member having a first hollow end section, the first end section including a first wall which defines a hollow interior of the first end section and which defines a first opening leading to the interior of the first end section, the first wall having at least one catch receiving opening, the second member having a hollow second end section, the second end section including a second wall which defines the hollow interior of the second end section and which is sized for insertion through the first opening into the interior of the first end section, latching means for releasably securing the first member to the second member upon insertion of the second end section into the first end section, the latching means including at least one catch means sized smaller than the catch receiving opening, the catch means being carried by the second end section and comprising means movable from a first retracted position in which the catch means does not project substantially from the outer surface of the second wall to a second latching position in which the catch means projects outwardly beyond the outer surface of the second wall, the



latching means also including biasing means for biasing the catch means from the retracted position to the latching position whereby the catch means moves to the latching position and into the catch receiving opening and releasably secures the first and second members together when the second end section is inserted into the first end section and the catch means is aligned with the catch receiving opening, and latch actuator means carried by the second member and positioned outside of that portion of the second end section which is inserted into the first end section, the latch actuator means being coupled to the latching means for selectively moving the catch means from the latching position to the retracted position to thereby selectively release the second member from the first member, and further including a universal pivot and a mast mounting cup connected to the universal pivot, a mast means comprising a mast or a mast extension, the first member comprising the mast means and the second member comprising the cup.

4,875,425

HULL FORMS

Erbil H. Serter, 34, Chemin du Pommier, CH-1218 Grand-Saconnex, Switzerland

Filed Nov. 25, 1987, Ser. No. 125,176

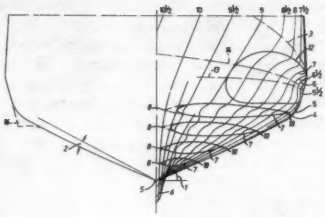
Claims priority, application European Pat. Off., Nov. 26, 1986, 86309223.5

Int. Cl.⁴ B63H *5/08*

U.S. Cl. 114—56 **9 Claims**

1. A deep-Vee based hull form constructed and arranged for use in a displacement mode, the hull having side walls, a bow, and a bilge, the hull form having a datum line disposed proximate to the bilge of the hull, the bow having a plurality of horizontal cross-sections, the horizontal cross-sectons being generally parallel to the datum line, the hull form comprising at least one lateral groove at each side of the bow section, the hull having a deadrise angle of at least 20 degrees, said bow

section being extended below the datum line of the hull in a streamlined teardrop configuration, each horizontal cross-section of the bow disposed downwardly from the datum line being progressively smaller.



4,875,426

FLOAT ATTACHMENT FOR WATERCRAFTS

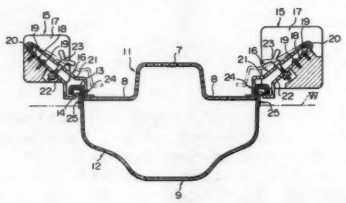
Katumasa Soga, Kobe, and Kazuo Matsutani, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kobushiki Kaisha, Japan

Filed Jan. 12, 1988, Ser. No. 143,113

Claims priority, application Japan, Jan. 16, 1987, 62-4480[U]

Int. Cl.[4] B63B *43/14*

U.S. Cl. 114—123 **2 Claims**



1. A float attachment for a small-sized watercraft having a deck, a hull including sides of the watercraft, and a bar handle, comprising:

flange portions formed at a junction between said deck and said hull;

at least one clamp comprising a hinge, a pair of clamp arms rockably connected to each other by said hinge, and means for closing said clamp arms; and

at least one float attached to said at least one clamp in such a manner that when the float is mounted on the watercraft by said at least one clamp the float provides buoyant support when the watercraft is mounted by a rider but the whole float is positioned above the water level during running of the watercraft without change in the relative positions of the watercraft and the float.

4,875,427

BOAT FENDERS WITH INTERNAL ROPE STORAGE CAPACITY

Rano J. Harris, Jr., Baton Rouge, La., assignor to Romar Technologies, Inc., Baton Rouge, La.

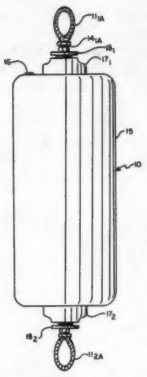
Filed Dec. 5, 1988, Ser. No. 279,516

Int. Cl.[4] B63B *59/02*

U.S. Cl. 114—219 **12 Claims**

1. A boat fender for suspension from a rope alongside the hull of a craft from a hitching device located on the craft for protection of the hull on contact thereof with a mooring site, which comprises

a body constituted of an enclosing wall providing an object of three-dimensional shape, the external surface of which can contact said mooring site for protection of the hull,



a chamber located within the confines of the enclosing wall of said body for containment and storage of the suspending rope when the boat fender is not in use.

4,875,428

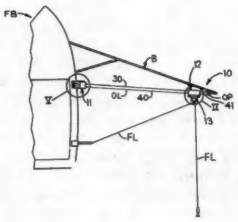
MOTORIZED OUTRIGGER DRIVE

Ronald D. Schlesch; Merrill H. Armstrong; Stafford J. Vallery, and Harold S. Durham, all of Stuart, Fla., assignors to Armstrong International, Inc., Three Rivers, Mich.

Filed Jan. 5, 1988, Ser. No. 141,020

Int. Cl.[4] B63B *35/14*

U.S. Cl. 114—255 **24 Claims**



12. A motorized outrigger drive for an outrigger of a fishing boat, the outrigger being of the kind having a boom fixedly cantilevered laterally outboard from the side of the boat for releasably trailing a fishing line from a point laterally spaced outboard from the side of the boat and thereby to minimize risk of tangling fishing lines when simultaneously trolling with several fishing lines, said outrigger drive comprising:

an outrigger line;

an outboard line direction changing means at the free end portion of said boom;

motorized drive means fixed with respect to said boat and boom and actuable for reversibly feeding said outrigger line around said outboard line direction changing means;

traveller means carried on said outrigger line and having means of supporting a fishing line release, said motorized drive means comprising a mounting base arranged for fixed mounting on said boat, an intermediate base swivel mounted on said mounting base, motor means supported on said intermediate base, a drive pulley driven by said motor means, and means defining a pair of line guide ports

adjacent to said drive pulley for guiding said outrigger line thereto.

4,875,429

BRAKING DEVICE FOR A CAPSULE AT THE END OF A TRAJECTORY

Charles N. Murray, and Michel R. Jamet, both of Ispra, Italy, assignors to European Economic Community, Luxembourg, Luxembourg

Filed Jun. 29, 1988, Ser. No. 213,200

Claims priority, application Luxembourg, Jun. 29, 1987, 86933

Int. Cl.[4] B63B *35/00*

U.S. Cl. 114—331 **7 Claims**

1. A submarine braking device for slowing down a capsule at the end of fast movement, this capsule gliding by gravity along a guiding cable which passes through an axial guiding channel of the capsule before hitting said device which is situated at the lower end of this cable, characterized by the fact that it comprises a series of disks (6 to 9) which are each fixed coaxially on said cable (3) by individual squeezing means (11, 12) authorizing a gliding of these disks on the cable, if an axial impact threshold is exceeded, and that the end of the cable (16) is attached to a shock-absorbing cylinder (13) which cooperates with a piston (14) fixed to the cable by means (15) similar to the disk squeezing means, so that the piston penetrates into the cylinder under the impact of the adjacent disk (8), the wall of the cylinder (13) having a plurality of holes (17), the diameter of which decreases towards the bottom of the cylinder.

4,875,430

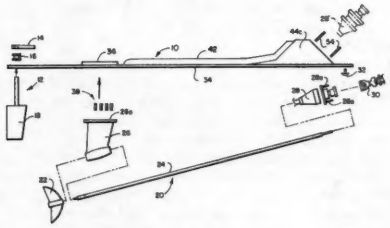
BOAT BUILDING METHOD USING MODULAR PROPULSION SYSTEM

William L. Sirois, Pembroke Park, Fla., assignor to Copeland-Sirois Enterprises, Inc., Jefferson, La.

Filed Apr. 19, 1988, Ser. No. 183,235

Int. Cl.[4] B63H *23/08*

U.S. Cl. 114—355 **16 Claims**



9. An assembly for use in constructing an engine-powered propeller-driven water craft, said assembly comprising:

a propeller shaft;

a support strut, including a base, for supporting said propeller shaft; and

a main casting, adapted to be integrally incorporated in the hull of a water craft, comprising an elongate substantially flat base portion, a first recessed pocket formed in said base portion having an aperture therein through which said propeller shaft extends; a further recessed pocket formed in said base portion for receiving the base of said support strut therein, and

a thrust bearing assembly connected to said propeller shaft and disposed wholly within said first pocket so to be located above the keel line of the water craft in which the main casting is adapted to be incorporated and connected to said first pocket so that thrust is transmitted through the main casting to the hull of the water craft in which the main casting is incorporated.

4,875,431

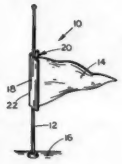
WIND DEFLECTOR

Ronald F. Dobosz, 8710 Washington St., Omaha, Nebr. 68127, assignor to John R. Boro and Ronald F. Dobosz, both of Omaha, Nebr.

Filed Aug. 26, 1988, Ser. No. 237,235

Int. Cl.[4] G09F *17/00*

U.S. Cl. 116—173 **4 Claims**



1. In combination:

a cylindrical vehicle aerial projecting vertically from a vehicle;

a generally planar pennant having forward and rearward ends;

said pennant having its forward end wrapped around a portion of said aerial such that said pennant is positioned in a vertical plane extending horizontally;

a wind reflector removably mounted on said aerial on the forward end of said pennant, so as to removably hold said pennant on said aerial;

said wind deflector including a vertically-oriented elongated body having upper and lower ends and a forward portion and rearward portion;

said deflector body including a pair of walls diverging rearwardly;

resilient rubber bracket means mounted on the rearward portion of said deflector and extending longitudinally along said body, said bracket means having a longitudinal slot therein adatped to snap-fit onto said aerial;

said deflector having a vertical length at least as great as the vertical height of said pennant;

said deflector walls located so as to deflect wind around the forward end of said pennant.

4,875,432

VOLLEYBALL SCOREBOARD

Joseph D. Cohen, P.O. Box 292401, Lewisville, Tex. 75029-2401, and Hyman H. Cohen, 120 DeMont Ave. East No. 309, Little Canada, Minn. 55117

Filed Oct. 17, 1988, Ser. No. 258,798

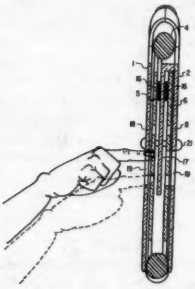
Int. Cl.[4] A63B *71/06*

U.S. Cl. 116—223 **15 Claims**

1. A game scoring device, which comprises:

a housing having opposed substantially transparent faces,

each of said faces having thereon a plurality of score indicia, and each of said faces having an access opening; and a pair of indicator panels rotatably mounted in said housing between said faces, each of said indicator panels



having thereon a score indicator, and each of said indicator panels having therein plurality of holes registerable with said access openings to permit said panels to be moved with respect to said housing.

4,875,433

ILLUMINATION METER DIAL DEVICE

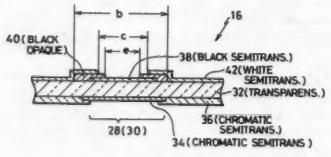
Sakae Tsukamoto, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Filed Oct. 7, 1988, Ser. No. 255,024

Claims priority, application Japan, Oct. 12, 1987, 62-155728[U]

Int. Cl.[4] G01D *13/18*

U.S. Cl. 116—335 **4 Claims**



1. A dial device for an illumination meter, for indicating marks formed on a dial plate by illuminating the dial plate by a lamp from inside, comprising:

(a) a transparent base plate;

(b) a black semitransparent layer coated on said transparent base plate so as to form a mark;

(c) a black opaque layer coated so as to cover a margin and an outer periphery of the mark formed by said black semitransparent layer; and

(d) a white semitransparent layer coated so as to cover a margin of said black opaque layer and all over the dial plate except the mark.

4,875,434

APPARATUS FOR COATING A SUBSTRATE WITH A COATING MATERIAL

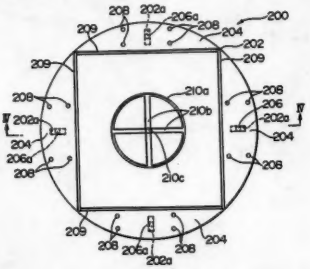
Taro Maejima; Toshio Yada; Michinari Tsutsumi; Tsuyoshi Tabuchi; Takeshi Terazono, and Masaru Aoki, all of Amagasaki City, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Apr. 1, 1988, Ser. No. 176,864

Claims priority, application Japan, Apr. 2, 1987, 62-82109; Apr. 20, 1987, 62-59814

Int. Cl.[4] B05C *1/02, 3/09, 7/06*

U.S. Cl. 118—52 **7 Claims**



1. An apparatus for coating a substrate with a coating material comprising:

means for applying a coating material to a substrate having a flat surface and a non-circular periphery, the coating being applied to the flat surface;

a support table;

mounting means for fixedly mounting the substrate having a flat surface and a non-circular periphery on said support table;

drive means for rotating said support table;

a plurality of shaping members slidably mounted on and sliding along said support table for engaging the non-circular periphery of the substrate mounted on said support table and for thereby forming, together with the non-circular substrate, a circularly shaped surface;

biasing means provided for biasing said slidably mounted shaping members into contact with the non-circular periphery of the substrate mounted on said support table; and

level adjusting means for adjusting the levels of the slidable shaping members relative to said support table so that said shaping members are flush with the flat surface of the substrate mounted on said support table.

4,875,435

FLUIDIZED BED DRYER/GRANULATOR

Chaur-Ming Jan, Randolph, N.J., and Mark E. Oehling, Stroudsburg, Pa., assignors to Warner-Lambert Company, Ann Arbor, Mich.

Filed Feb. 24, 1988, Ser. No. 159,805

Int. Cl.[4] B05C *19/02*

U.S. Cl. 118—62 **8 Claims**

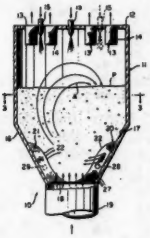
1. A fluidized bed apparatus for drying particles, comprising:

a chamber having a top wall, a side wall and a bottom wall;

an axial air inlet in the bottom wall communicating with the interior of the chamber for directing an axial flow of air upwardly through the chamber; and

at least one stationary removable lateral air inlet housing resting in said chamber on at least one of said side wall and bottom wall of the chamber and having a perforated side wall facing tangentially to the side wall of the chamber for discharging a flow of air into the chamber in a direction tangential to the chamber side wall, the axial and lateral air flows interacting to produce a swirling or orbital motion for suspending and circulating said particles in a three-dimensional rotational path in the interior of the

chamber for thorough admixing and drying of the particles, said removable lateral air inlet housing being capable



of being simply lifted out of said chamber to quickly and easily adapt the apparatus to use in other processes.

4,875,436

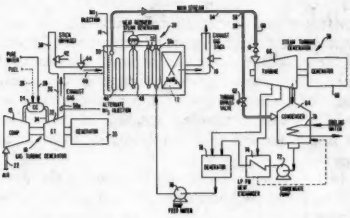
WASTE HEAT RECOVERY SYSTEM

Edward M. Smith, Wyncote, Pa., and Richard C. Cornelison, Hiram, Ohio, assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 154,144, Feb. 9, 1988, abandoned. This application May 23, 1988, Ser. No. 197,530

Int. Cl.[4] F22D *1/00*

U.S. Cl. 122—7 R **16 Claims**



1. A waste heat recovery system comprising in combination:

(a) a conduit for conveying an exhaust gas stream;

(b) a boiler assembly connected to said conduit including a heat recovery steam generator through which said exhaust gas is flowed, and characterized by a high temperature steam tube heat exchanger and, at a downstream location relative thereto, a water-tube boiler;

(c) an ammonia gas injector for injecting ammonia gas into the exhaust gas stream and located upstream of the water-tube boiler in juxtaposition to the exhaust gas source; and

(d) a low temperature selective catalytic reduction unit located downstream of the water-tube boiler.

4,875,437

APPARATUS FOR CONTROLLING THE FLOW OF COOLING FLUID IN AN ENGINE

Andre Cook, and Jean P. Chamot, both of Arpajon, France, assignors to Procedes Vernet, Arpajon Cedex, France

Filed Dec. 3, 1987, Ser. No. 128,438

Int. Cl.[4] F01P *7/16*

U.S. Cl. 123—411 **24 Claims**

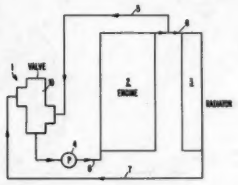
1. Apparatus for controlling the flow of cooling fluid in a cooling system for an internal combustion engine, wherein the cooling system includes a circulating pump, a first flow path from the engine through a heat exchanger and back to the engine and a second, bypass flow path from an outlet of the engine to an inlet of the engine, comprising:

a thermostatic valve having a body defining a chamber;

a first port into said chamber, said first port being in communication with the heat exchanger;

a second port into said chamber, said second port being in communication with the engine;

means for controlling fluid flow through said first and second ports, said fluid flow controlling means comprising at least one valve element moveable from a position closed with respect to one of said ports to control the flow through said first and second ports; and



means for operating said fluid flow control means, said operating means comprising a first thermostatic element mounted in said chamber and connected to said valve element, said first thermostatic element being responsive to the temperature of fluid in said chamber to move said valve element relative to said ports, and a second thermostatic element connected to said first thermostatic element, said second thermostatic element operable independent of said first thermostatic element and being responsive to parameters other than and independent of the temperature of fluid in said chamber to open said valve element and, thereby, vary the operation of said fluid flow controlling means.

4,875,438

METHOD OF CONTROLLING COMPOSITE INTAKE MANIFOLD SYSTEM FOR INTERNAL COMBUSTION ENGINE

Shigeru Suzuki, Tokorozawa, and Shinichi Shimida, Utsunomiya, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1987, Ser. No. 117,695

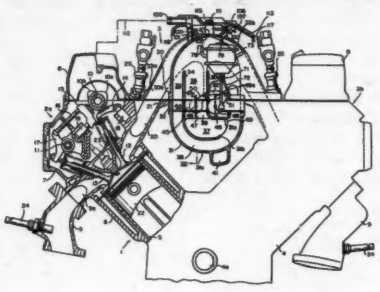
Claims priority, application Japan, Nov. 5, 1986, 61-262031

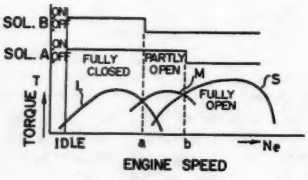
Int. Cl.[4] F02B *3/00*

U.S. Cl. 123—52 MB **15 Claims**

1. A method of controlling a composite intake manifold system for supplying intake air to an internal combustion engine, said composite intake manifold system including an intake distribution chamber coupled to a throttle valve disposed upstream thereof in a direction in which said intake air flows, longer and shorter intake pipes extending from said intake distribution chamber, bypass valves disposed in said shorter intake pipes, respectively, said longer and shorter intake pipes being joined into intake passages downstream of said bypass valves in said direction, said intake passages being adapted to be connected to respective cylinders of the internal combustion engine, said method comprising the steps of:

adjusting the amount of the intake air to flow into said intake distribution chamber with said throttle valve; and





controlling said bypass valves to be selectively fully closed, partly opened, and fully opened according to operating conditions of said internal combustion engine.

4,875,439

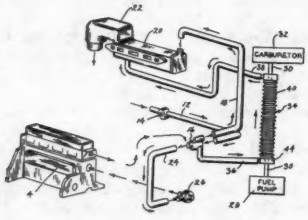
MARINE PROPULSION SYSTEM WITH FUEL LINE COOLER

Steven L. Widmer, Oshkosh, Wis.; Gerald F. Nelsen, Merritt Island, Fla.; Jeffrey P. Ruhnke, Fond du Lac, Wis.; Thomas J. Steffes, Fond du Lac, Wis., and Brian S. Buchholz, North Fond du Lac, Wis., assignors to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 204,631, Jun. 9, 1988, which is a division of Ser. No. 2,309, Jan. 9, 1987, Pat. No. 4,768,492. This application Mar. 14, 1989, Ser. No. 324,253

Int. Cl.[4] F02M *31/20*

U.S. Cl. 123—541 **11 Claims**



1. In a marine propulsion system having a water-cooled internal combustion engine in a heat-retentive compartment, and including a fuel line in said compartment supplying fuel for combustion by said engine, fuel line cooler means in said compartment in heat transfer relation with said fuel line and having an inlet communicating with a source of cooling water and having an outlet for discharging water, wherein said fuel line cooler comprises a water hose and clamp means clamping said water hose into heat transfer relation with said fuel line, wherein said clamp means comprises heat transfer material and mounts said fuel line and said water hose in spaced relation separated by said heat transfer material.

4,875,440

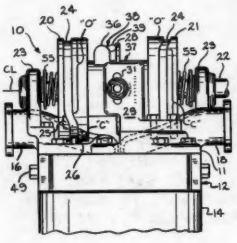
VALVE CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Stephen J. Kaptur, 1841 Dority Blvd., Toledo, Ohio 43615

Filed Dec. 9, 1988, Ser. No. 281,662

Int. Cl.[4] F01L *7/08*

U.S. Cl. 123—81 B **5 Claims**



1. A valve control system for an internal combustion engine, said system comprising a primary control and a secondary control for modifying the operation of the primary control, said primary control comprising:

a camshaft journaled for rotation in camshaft brackets,

intake and exhaust cylindrical cams mounted on, for rotation with, the camshaft, said cams including cam channels,

valve pin means, connectable to valves in the associated engine, for cooperating with the cam channels in said cylindrical cams to translate rotation of the cylindrical cams into a pattern of controlled reciprocation of the valves and

timing belt means for imparting rotation to the camshaft from a rotatable part of the engine, said secondary system comprising

control plate means adjustably mounted between said cylindrical cams,

rocker arm means mounted on said camshaft for rotation therewith, said last named means including a contact leg and a driver leg, said contact leg being positioned to selectively contact said control plate means during rotation of said camshaft, wherein such contact displaces said driver leg of said rocker arm means, and

at least one driver positioned between said driver leg and one of said cylindrical cams, said driver being operable, when the driver leg is in contact therewith, to transmit displacement of the driver leg to one of said cylindrical cams thereby modifying the pattern of controlled reciprocation of at least one of the valves.

4,875,441

ENHANCED EFFICIENCY VALVE ACTUATOR

William E. Richeson, and Frederick L. Erickson, both of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Jan. 6, 1989, Ser. No. 294,728

Int. Cl.[4] F01L *9/02*

U.S. Cl. 123—90.13 **23 Claims**

1. A bistable electronically controlled fluid powered transducer having a first member reciprocative in a housing along an axis between first and second positions;

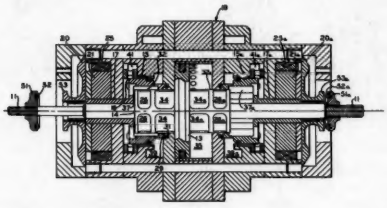
a control valve reciprocative in said housing along said axis

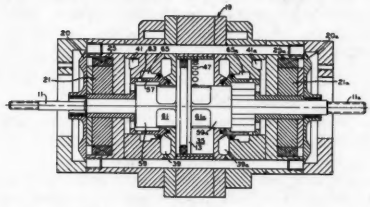
between open and closed positions and having first and second opposite surfaces;

magnetic latching means comprising a permanent magnet for closing and holding said control valve in its closed position;

electromagnetic means for temporarily neutralizing the effect of said magnetic latching means to release the control valve to move from the closed position towards the open position;

fluid pressure means comprising a fluid pressure source for providing fluid pressure to said valve to move said valve toward said open valve position against the holding force of said permanent magnet;





means to energize said electromagnetic means to provide an electric pulse to said electromagnetic means to temporarily neutralize the effect of said permanent magnet so that said control valve can move in said one direction under fluid pressure from said source;

each of said member and said valve having first and second opposite axial ends;

said member first axial end carrying a valve end engaging abutment for abutting said valve first axial end to urge said valve towards said closed position during travel of said member towards said first position thereby damping the motion of said first member and providing impetus to said valve towards said closed position.

4,875,442

CERAMIC ROCKER ARM

Shigeaki Akao, and Masato Taniguchi, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Dec. 22, 1988, Ser. No. 288,128

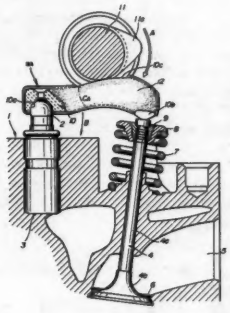
Claims priority, application Japan, Dec. 24, 1987, 62-196253[U]

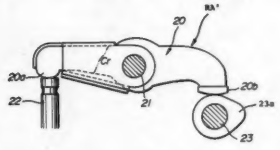
Int. Cl.[4] F01L *1/18*

U.S. Cl. 123—90.39 **6 Claims**

1. A rocker arm for an internal combustion engine, comprising:

a main body section made of ceramics and having an outer surface; and





a protective member section made of a ductile material and covering said outer surface of said main body section.

4,875,443

START CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

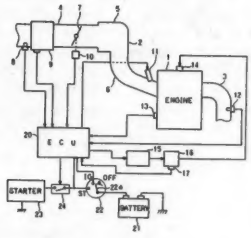
Ryuichi Sano, Oobu, and Shigenori Isomura, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 10, 1988, Ser. No. 154,373

Claims priority, application Japan, Feb. 17, 1987, 62-34239

Int. Cl.[4] F02D *41/06*

U.S. Cl. 123—179 G **7 Claims**



1. A start control system for an internal combustion engine comprising:

fuel injection means for injecting fuel into said engine when activated;

starter means for cranking said engine when energized;

command means for generating a command instructing initiation of operation of said engine;

first control means for initiating activation of said fuel injection means in response to said command from said command means so that a predetermined pre-start fuel (TAU)

is injected thereby, wherein said first control means determines an amount of said pre-start fuel in dependence on said temperature of said engine and decreasingly corrects said amount of pre-start fuel as a number of pre-start fuel injection previously attained increases; and

second control means for disabling energization of said starter means until said pre-start fuel injected by said fuel injection means starts to vaporize, wherein said second control means determines a delay period (T_D) in dependence on a temperature (THW) of said engine in response to said command from said command means and initiates energization of said starter means when the determined delay period elapses from said command from said command means so that said pre-start fuel is taken into said engine after being vaporized during said delay period.

4,875,444

SWIRL CHAMBER FOR DIESEL ENGINES AND THE LIKE

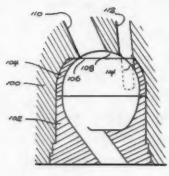
Hirofumi Tsuchida, Yokosuka; Toshiaki Tanaka, Fujisawa; Akira Oyamada, Yono, and Sumio Hirao, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

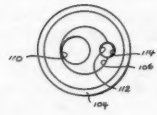
Filed Jul. 28, 1988, Ser. No. 225,188

Claims priority, application Japan, Jul. 29, 1987, 62-116404[U]

Int. Cl.[4] F02B *3/00, 75/98*

U.S. Cl. 123—270 **8 Claims**





1. In a swirl chamber type internal combustion engine

a thermally insulating member disposed in a recess formed in a metallic cylinder head, said insulating member including a cavity which defines a portion of said swirl chamber;

means defining an aperture in said insulating member; and

means defining a metallic projection which fits into said aperture, said projection including first and second bores, said first and second bores being arranged to receive first and second devices.

4,875,445

COMBUSTION CHAMBER OF A SUB-CHAMBER TYPE INTERNAL COMBUSTION ENGINE

Koji Imoto; Mataji Tateishi; Tadao Omura, all of Nagasaki; Kunihiko Nakajima, Mukou; Motoyuki Maekawa, Kyoto; Moritake Matusyama, Kyoto, and Hiroki Tamura, Kyoto, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 159,942

Claims priority, application Japan, Mar. 13, 1987, 62-56916

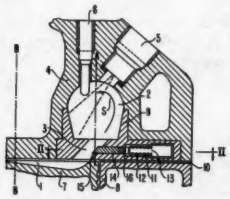
Int. Cl.[4] F02B *19/18*

U.S. Cl. 123—292 **8 Claims**

1. A combustion chamber of a sub-chamber type internal combustion engine, comprising:

a sub-chamber port communicating a main combustion chamber with a subsidiary combustion chamber formed within a cylinder head;

a space portion formed in a cylinder head member on a side of a sub-chamber port wall located farthest from a cylinder center line on a cross-sectional plane of said sub-chamber port defined as a plane including a center line of the subsidiary combustion chamber and a center line of a cylinder, said space portion opening into said sub-chamber port;



an expansible/contractible tube contained within said space portion;

a sub-chamber port control rod connected to said expansible/contractible tube and slidably extending into said space portion; and

a working substance sealingly filled into said expansible/-contractible tube and having the characteristic of undergoing large expansion and contraction in response to temperature variations.

4,875,446

SYSTEM AND METHOD FOR CONTROLLING AN ENGINE IDLING SPEED FOR AN INTERNAL COMBUSTION ENGINE

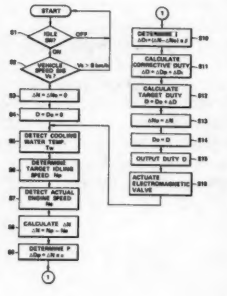
Toshikazu Nemoto, and Shinsuke Nakazawa, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Mar. 31, 1988, Ser. No. 177,913

Claims priority, application Japan, Apr. 9, 1987, 62-85680

Int. Cl.[4] F02M *3/12*

U.S. Cl. 123—339 **16 Claims**



1. A system for controlling an engine idling speed for an internal combustion engine, comprising:

(a) first means for detecting an engine operating condition, the first means including a first sensor for detecting an engine speed and a second sensor for detecting an engine coolant temperature;

(b) second means for determining whether the engine falls in an engine idling condition on the basis of the engine operating condition;

(c) third means for controlling a fluid flow quantity passing through a bypass passage installed in an intake passage of

the engine when the engine falls in the engine idling state on the basis of an input signal having a controlled duty ratio, the duty ratio having a feedback control proportional coefficient and a feedback control integration coefficient and being varied according to the engine coolant temperature, so that the engine speed detected by the sensor coincides with a target engine speed determined according to the engine operating condition; the third means having an electromagnetic valve installed in the bypass passage for opening and closing the bypass according to the input signal having the duty ratio determined according to the engine operating condition; and

(d) fourth means for varying the fluid flow quantity characteristic of the third means according to the engine operating condition, the fourth means having fifth means for heating a coil portion of the electromagnetic valve to a temperature which coincides with the engine coolant temperature so that the fluid flow quantity characteristic of the electromagnetic valve is varied according to the engine cooling water temperature representing the engine operating condition.

4,875,447

METHOD AND APPARATUS FOR CONTROLLING THE SOLENOID CURRENT OF A SOLENOID VALVE WHICH CONTROLS THE AMOUNT OF SUCTION OF AIR IN AN INTERNAL COMBUSTION ENGINE

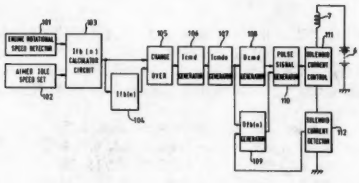
Takeo Kiuchi, and Hidetoshi Sakurai, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 920,544, Oct. 20, 1986, abandoned. This application Mar. 31, 1988, Ser. No. 178,807

Claims priority, application Japan, Oct. 21, 1985, 60-233356; Oct. 21, 1985, 60-233361

Int. Cl.[4] F02D *41/16*

U.S. Cl. 123—339 **5 Claims**



1. A method of controlling a solenoid current of a solenoid valve which controls the amount of suction air of an internal combustion engine, said control valve being a proportionally controllable valve whose opening degree can be controlled in proportion to supply current, said method comprising the steps of:

detecting engine rotational speed;

setting an aimed idling speed corresponding to a predetermined idling speed;

calculating a feedback control valve as a function of a deviation signal between said engine rotational speed and said predetermined idling speed;

calculating a solenoid current control value based upon the feedback control valve;

determining a corrected solenoid current control value as a function of the solenoid current control value, the function being for converting from the solenoid current control value to the corrected solenoid current control value to make the opening degree of said control valve proportional to said solenoid opening degree control value;

determining a pulse duration signal as a function of the corrected solenoid correct control value, the function being for converting from the corrected solenoid current control value to an output current of a driving circuit to make input-output characteristics in the driving circuit of the solenoid valve proportional to the corrected solenoid current control value; and

controlling said solenoid, current as a function of said, pulse duration signal.

4,875,448

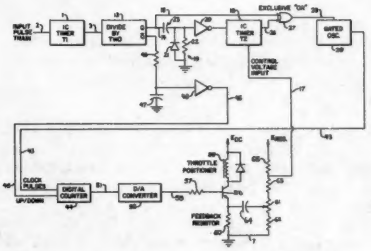
CYCLIC RESPONDING ELECTRONIC SPEED GOVERNOR

Richard A. Dykstra, Cedar Grove, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Sep. 23, 1988, Ser. No. 249,341

Int. Cl.[4] F02D *41/16*; B60K *31/00*

U.S. Cl. 123—352 **24 Claims**



1. An electronic speed governor system, comprising:

signal input means for producing a source input signal indicative of actual speed;

control means responsive to said source input signal and a control input signal for producing a control output signal indicative of a desired speed;

comparator means for comparing said source input signal with said control output signal to produce an error signal proportional to the difference between said source input signal and said control output signal;

oscillator means responsive to said error signal for producing a timing signal proportional to said error signal;

counter means responsive to said timing signal and said source input signal for producing a continuous counter output signal; and

actuator means responsive to said continuous counter output signal for adjusting said actual speed.

4,875,449

ARRANGEMENT FOR PREVENTION OF TROUBLESOME LOAD CHANGE SHOCKS IN AN INTERNAL COMBUSTION ENGINE SERVING TO PROPEL A VEHICLE

Karl-Martin Krämer, Wolfsburg, and Richard Dorenkamp, Isenbüttel, both of Fed. Rep. of Germany, assignors to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany

Filed Oct. 19, 1988, Ser. No. 259,971

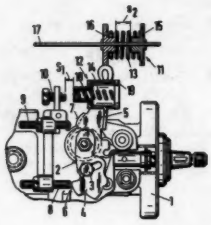
Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 3739361

Int. Cl.[4] F02D *11/04*

U.S. Cl. 123—400 **5 Claims**

1. Apparatus for preventing troublesome load change shocks in an internal combustion engine for driving a vehicle comprising a power control element, adjustment lever means for the power control element, engine power control means delivering commands for said power control element, first spring means operationally positioned between the engine power control means and the adjustment lever means, and second spring means stronger than the first spring means and operationally positioned between the adjustment lever means and a stop member, whereby the adjustment lever means is first moved

from an idling position by motion of the engine power control means, then remains stationary during further movement of the



engine power control means, and then moves again during still further movement of the engine power control means.

4,875,450

IGNITION TIMING CONTROLLING DEVICE FOR AN INTERNAL COMBUSTION ENGINE

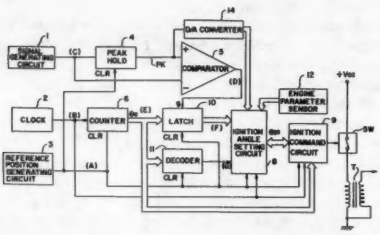
Haruhiko Yoshikawa, Niiza, and Makoto Kawai, Tokorozawa, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1988, Ser. No. 143,333

Claims priority, application Japan, Jan. 13, 1987, 62-5638; Jan. 16, 1987, 62-7627

Int. Cl.[4] F02P 5/145

U.S. Cl. 123—425 **9 Claims**



1. An ignition timing controlling device for an internal combustion engine comprising:

a reference position signal generating means for generating a reference position signal each time the rotational angular position of a crank of an internal combustion engine reaches a reference angular position;

a pressure indicating signal generating means for generating a pressure indicating signal indicative of an internal pressure of a combustion chamber of said engine;

a peak detecting means for generating a pressure indicating peak value, a position signal indicative of a maximum peak value and a position of the pressure indicating signal after generation of a reference position signal until generation of a next reference position signal; and

an ignition instructing means for instructing ignition at an ignition angle corresponding to the pressure indicating peak value and the position signal;

said ignition instructing means delivers an ignition instruction at an ignition timing depending upon a history of change of the pressure indicating peak position while the rate of change of the pressure indicating peak value is low;

said ignition instructing means delivers an ignition instruction at an ignition timing independent of the pressure indicating peak position when said engine is operating at a low speed and the rate of change of the pressure indicating peak value is high.

4,875,451

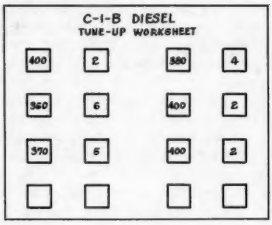
DIESEL TUNE UP METHOD

Robert J. Evasick, and Edward J. Evasick, both of 337 E. San Ysidro Blvd., Unit "E", San Ysidro, Calif. 92073

Filed Jul. 14, 1988, Ser. No. 218,942

Int. Cl.[4] F02M 61/14

U.S. Cl. 123—435 **5 Claims**



1. A method of improving the performance of a multi-cylindered diesel engine having unit injectors by tuning, comprising the following steps:

(a) measuring the non-combustion compressions of a plurality of the cylinders of said diesel engine and noting the relative compressions of the cylinders relative to one another; and,

(b) selecting and installing fuel injectors of differing flow rates, with the particular flow rate of each injector being so installed, being inversely related to the relative compression of the cylinder into which it is being installed, such that cylinders having relatively low compression are fitted with injectors having relatively high flow rates and vice-versa.

4,875,452

FUEL CONTROL APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

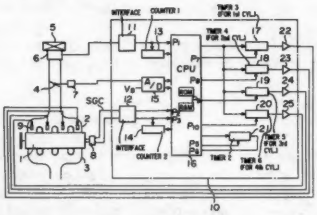
Toshiro Hara; Takanori Fujimoto, and Ikuo Musa, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 214,056

Claims priority, application Japan, Jul. 6, 1987, 62-169084; Jul. 14, 1987, 62-176291; Jul. 22, 1987, 62-184154

Int. Cl.[4] F02D 41/18, 41/06; F02M 51/00

U.S. Cl. 123—488 **5 Claims**



1. A fuel control apparatus for an internal combustion engine comprising an crank angle sensor producing a crank angle signal at a predetermined crank angle in said engine, an intake air quantity detecting means for detecting the quantity of intake air sucked in the engine, an injector for injecting fuel to an engine cylinder, and a control means for actuating the injector at a driving time in response to the quantity of intake air and at a timing determined by the crank angle signal, said fuel control apparatus being characterized by comprising a

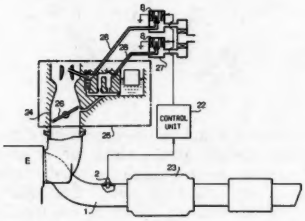
period calculating means for calculating the next period on the basis of the previous period and the present period in the crank angle signal and an injection-initiating time control means for controlling time to actuate the injector in accordance with the next period of the crank angle signal.

4,875,453

AIR-FUEL RATIO CONTROL SYSTEM FOR AN ENGINE

Kunihoro Abe, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 170,441
Claims priority, application Japan, Mar. 23, 1987, 62-069563
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—440 **7 Claims**



1. In an air-fuel ratio control system for an engine, having an exhaust gas sensor for sensing concentration of content of exhaust gases of the engine providing an output of the exhaust gas sensor dependent on the concentration, an actuator for controlling air-fuel ratio of mixture to be supplied to the engine, a feedback control system responsive to the output of the exhaust gas sensor for operating the actuator to control the air-fuel ratio dependent on the output of the exhaust gas sensor, the feedback control system including peak value producing means for producing an upper peak value signal and representing an upper peak value a lower peak value signal, first reference value providing means responsive to the upper and lower peak value signals for providing a reference value, a comparator for comparing the output of the exhaust gas sensor with the reference value for producing an error signal, and a driving circuit responsive to the error signal for operating the actuator, the improvement in the air-fuel ratio control system comprising:

a limiter including a second reference value providing means for representing a maximum voltage which varies in accordance with the reference value and which is higher than the upper peak value, said reference value constituting a first reference value and said maximum voltage constituting a second reference value;

said limiter is provided between the exhaust gas sensor and the peak value producing means for cutting off a part of voltage exceeding said second reference value to prevent an abnormal voltage from entering the peak value producing means;

the limiter includes at least one zener diode connected to an input of the peak value producing means;

said zener diode is provided for reverse-biasing to cut off said voltage exceeding said second reference value; and

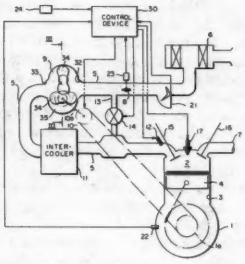
said limiter preventing the upper peak value from exceeding said second reference value.

4,875,454

SUPERCHARGING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Haruo Okimoto, and Seiji Tashima, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 13, 1988, Ser. No. 143,627
Claims priority, application Japan, Feb. 17, 1987, 62-33913
Int. Cl.[4] F02B *33/38*
U.S. Cl. 123—559.3 **8 Claims**



1. A supercharging apparatus for an internal combustion engine comprising:

supercharger means to be disposed in an intake passage means of the engine;

mechanical transmission means for driving the supercharger from the engine at a speed proportional to the engine speed;

said mechanical transmission means including a stepwise variable transmission having a plurality of gear stages and one-way clutch means for interrupting the driving relationship between a lower gear stage and an input to the lower gear stage during shift-up operation; and

control means for shifting the stepwise transmission;

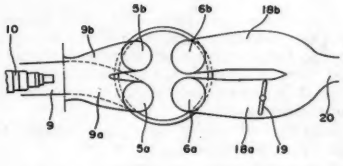
said control means having a plurality of shift change patterns which determine a suitable gear ratio of the stepwise transmission according to engine driving conditions, each of which is different from one another in the engine driving conditions where the stepwise transmission is shifted from a predetermined gear ratio to another predetermined gear ratio.

4,875,455

AUTOMOBILE EXHAUST GAS RECIRCULATING SYSTEM

Noboru Hashimoto; Mitsuo Hitomi; Koji Onishi; Yoshikuni Yada, all of Hiroshima; Hidetoshi Nobumoto, Higashihiroshima, and Makoto Hotate, Kure, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 12, 1988, Ser. No. 180,781
Claims priority, application Japan, Apr. 28, 1987, 62-107112; Jul. 27, 1987, 62-185492
Int. Cl.[4] F02M *25/06;* F01L *1/26;* F02B *75/40*
U.S. Cl. 123—568 **11 Claims**



1. An exhaust gas recirculating system of a combustion

engine having at least one cylinder including a combustion chamber communicating with a source of combustible air-fuel mixture through at least one intake port adapted to be selectively closed and opened for effecting the interruption and admission of the supply of the combustible mixture into the combustion chamber, the combustion chamber also communicating with an exhaust system through first and second exhaust ports both adapted to be selectively opened and closed, said exhaust gas recirculating system comprising:

an intake valve operatively associated with the intake port for selectively opening and closing the intake port;

first and second exhaust valves operatively associated with the first and the second exhaust ports, respectively, for selectively closing and opening the first and second exhaust ports in a manner generally opposite to the manner in which the intake valve opens and closes the intake port, said first exhaust valve being operable to completely close the first exhaust port subsequent to the complete closure of the second exhaust port by the second exhaust valve;

an exhaust passage extending between the first exhaust port and the exhaust system;

an exhaust shutter means operatively associated with the exhaust passage for selectively opening and closing the exhaust passage

sensor means for sensing the load imposed on the engine and the speed at which the engine is operating; and

control means for determining the operating condition of the engine based on the load and speed thereof,

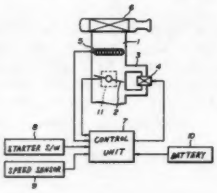
, and said control means operatively connected to said shutter means for controlling said shutter means to close the exhaust passage when the engine is operating at a relatively low speed under a relatively low load, and when the engine is operating at a relatively low speed under a relatively high load, and to partially open the exhaust passage a predetermined amount when the engine is operating at a relatively medium speed under a relatively medium load to regulate the amount of exhaust gases remaining in the cylinder when the engine is operating at a relatively medium speed under a relatively medium load.

4,875,456

SELF-DIAGNOSIS SYSTEM FOR AUXILIARY AIR CONTROL SYSTEM OF INTERNAL COMBUSTION ENGINE

Naoki Tomisawa, Gunma, Japan, assignor to Japan Electronic Control Systems Company Limited, Isezaki, Japan

Filed Feb. 8, 1989, Ser. No. 307,466
Int. Cl.[4] F02D *9/00, 41/18*
U.S. Cl. 123—585 **20 Claims**



1. A self-diagnosis system for an auxiliary air control system of an internal combustion engine having an auxiliary air control valve, provided in an auxiliary air passage which bypasses a throttle valve of an air intake system of said engine, for controlling the amount of air inducted through said auxiliary air passage, comprising:

first means for detecting the amount of air inducted through a main air intake passage of said engine;

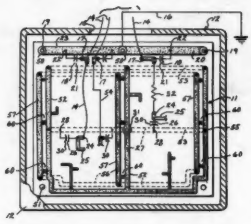
second means comparing the amount of air detected by said first means while said throttle valve is fully closed with a value calculated according to the opening angle command signal for said auxiliary air control valve, said second means judging that said auxiliary air control system is malfunctioning if said intake air amount detected by said first means is larger than said calculated value.

4,875,457

APPARATUS AND METHOD FOR PROTECTING ENGINE ELECTRONICS FROM RADIO FREQUENCY INTERFERENCE

Arthur O. Fitzner, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 16, 1988, Ser. No. 232,798
Int. Cl.[4] H04B *1/10*; F02P *15/00*
U.S. Cl. 123—633 **15 Claims**



1. In an electronic control module including electronic circuit means, a metal housing and external conductors extending through the housing and having electrical connections to the circuit means, a system for suppressing RFI signals induced in the conductors and entering the electronic module via the conductors comprising:

an external ground connection to the housing;

first RFI voltage shunt means connecting each conductor to the housing closely adjacent its entry through the housing;

second RFI voltage shunt means connecting each conductor to the ground network for the circuit means closely adjacent the connection of the conductor to the circuit means; and,

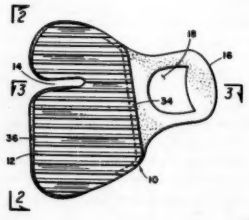
a single ground connection between the housing and the ground network for the circuit means.

4,875,458

SHOOTING TAB

Lloyd L. Young, Rte. 2, E. Hiway 50, Sedalia, Mo. 65301

Filed Jan. 11, 1989, Ser. No. 297,135
Int. Cl.[4] F41B *5/00*
U.S. Cl. 124—35 A **9 Claims**



4. A shooting tab for use with a bow having a string for shooting an arrow which comprises:

a finger loop with a finger hole;

a tab facing secured to said finger loop, said tab facing having an arrow notch having a longitudinal axis therein, said

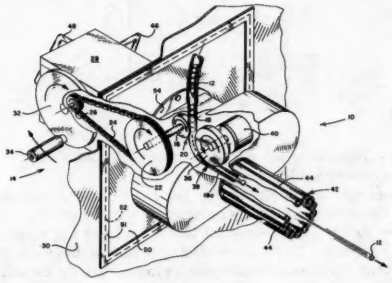
facing having a front and a back, said front contacting said string when said shooting tab is used, said front having parallel ribs which are essentially parallel to said longitudinal axis of said arrow notch.

4,875,459

GATTLING-LIKE GUN

Daniel N. Van Elderen, Los Altos Hills, and Gerald J. Lichac, Santa Cruz, both of Calif., assignors to 501 Atari Games, Milpitas, Calif.

Filed Sep. 11, 1987, Ser. No. 95,746
Int. Cl.[4] F41B *1/00*
U.S. Cl. 124—49 **3 Claims**



1. A gun for propelling a plurality of projectiles at a predetermined rate, comprising:

means having a projectile feed inlet and feed outlet for propelling a projectile received in said inlet through said outlet;

supply means providing serially a plurality of projectiles;

feeder means coupled between said supply means and said propelling means for receiving serially a plurality of projectiles from said supply means and feeding them individually and serially into the projectile feed inlet, said feeder means being manually controllable to vary the rate projectiles are fed into said feed inlet, wherein said feeder means includes a manually rotatable crank means, wherein the rate of object feed is proportional to the rate of crank means rotation, and wherein said feeder means includes a pinch roller forming a first nip region disposed to receive projectiles from said supply means and drivingly coupled to said crank means, whereby rotation of said crank means rotates said pinch roller; and

said propelling means being coupled to said feeder means downstream of said pinch roller and including a second pinch roller forming a second nip region and motor means for rotating said second pinch roller at a predetermined speed.

4,875,460

GRINDING WHEEL DRESSING APPARATUS

John Stevenson, 781 E. Golfview Dr., Roselle, Ill. 60172

Filed Sep. 12, 1988, Ser. No. 242,631
Int. Cl.[4] B24B *53/00*
U.S. Cl. 125—11 DF **9 Claims**

1. An apparatus for dressing grinding wheels comprising:

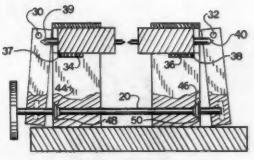
a base support;

first and second tower members affixed to said base support;

first and second end lever members pivotally mounted proximate their upper extremities to said first and second tower members respectively;

screw means arranged to extend through said tower members and to engage the lower extremities of said end lever members, whereby selective rotation of said screw means causes responsive pivotal movement of said end lever members; and

first and second slide members each having a working extremity and a control extremity, arranged to carry abrasion means on said working extremity for dressing of the grinding wheel, said slide members being mounted for



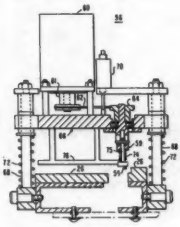
reciprocal motion within said first and second tower members respectively, and being positioned to contact said first and second end lever members respectively at their control extremities proximate said pivots of said end lever members, whereby pivotal movement of said end lever members causes controlled responsive movement of said slide members.

4,875,461

AUTOMATIC DENDRITIC SILICON WEB SEPARATION MACHINE

Kristen T. Schara, Wilkinsburg; David B. Kulik, Jeannette, and Scott E. McIlvaine, Acme, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 1, 1988, Ser. No. 176,558
Int. Cl.[4] B28D *1/32*
U.S. Cl. 125—23 R **15 Claims**



1. A machine for automatically cutting a dendritic silicon web into pieces of predetermined length, comprising:

first work station means for scribing the web to define a web piece of predetermined length;

second work station means for placing an identifying mark on said web piece and for breaking off said web piece along said scribings; and

means for advancing the web by said predetermined length through said first and second work stations.

4,875,462

CAMPFIRE SMOKESTACK

Monroe A. Armstrong, and Marty A. Armstrong, both of Star Rte. 1, Box 15-A, Weston, Colo. 81091

Filed Oct. 3, 1988, Ser. No. 251,731
Int. Cl.[4] F24C *1/16, 15/08, 15/16*
U.S. Cl. 126—29 **12 Claims**

1. A smokestack for use with a campfire and comprising:

an elongated tube means having an open bottom end for receiving smoke emanating from a campfire and an open top end for releasing the smoke into the atmosphere, said tube means comprising a plurality of tube sections distrib-

uted along a longitudinal axis of said tube means and having ends joined to form a composite tube;

a base means for supporting said tube means with said open bottom end thereof directly above a campfire and defining openings that provide substantially unobstructed physical and visual access thereto thereby permitting both visual enjoyment of and addition of firewood to the campfire;

a cooking grate means for supporting food and disposed within said elongated tube means;

a door means defined in one of said tube sections for providing access to said grate means; and

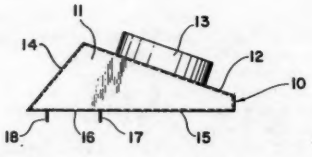
a plurality of rods, each extending through substantially horizontally aligned holes in one of said tube sections, and wherein said rods removably support said grate means.

4,875,463

STOVE TOP ADAPTER

James O. Washington, P.O. Box 2926, Huntington, W. Va. 25728

Filed May 9, 1989, Ser. No. 349,218
Int. Cl.[4] F24C 1/14
U.S. Cl. 126—80 4 Claims



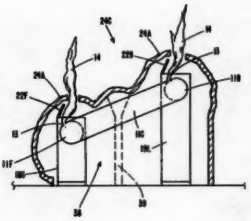
1. In a stove top adapter, a hollow member of quadrilateral configuration in cross-section having an inclined first top wall, an inclined second top wall attached at an upper end thereof to said first top wall, and an essentially horizontal bottom wall attached to said inclined second top wall at a lower end thereof, an opening in said bottom wall, said adapter being costructed and arranged to sit on top of an exhaust opening of a stove so that said opening in said bottom wall registers with said exhaust opening, and a collar extending directly from said first inclined top wall of said adapter at an essentially normal direction therefrom and constructed and arranged to extend upwardly from said first inclined top wall in a direction that is oblique to said essentially horizontal bottom wall.

4,875,464

CLEAN BURNING GAS LOG BURNER SYSTEM

Ronald J. Shimek, 8944 W. 154 St., Prior Lake, Minn. 55372, and Daniel C. Shimek, 5260 W. 132nd St., Apple Valley, Minn. 55124

Filed Aug. 18, 1988, Ser. No. 233,461
Int. Cl.[4] F24C 3/04
U.S. Cl. 126—92 R 20 Claims



1. A decorative gas log burning system, comprising:

decorative gas log means,

openings in said decorative gas log means to permit gas flames to appear as being emitted from the gas log means,

gas burner means mounted below said gas log means for producing large decorative gas flames directed unrestrained through said openings in said gas log means,

shield means mounted over said gas burner means,

said shield means having a pair of substantially vertical walls arranged on opposite sides of said gas burner means,

horizontal openings in said shield means opposite the openings in said gas log means for permitting said decorative flames to escape from said shield means, and

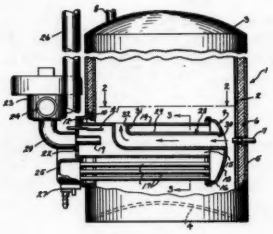
said shield means having a horizontal section connecting said vertical walls for restricting flames from said gas burner means to said openings in said gas shield means and said gas log means.

4,875,465

HIGH EFFICIENCY SUBMERSIBLE CHAMBER WATER HEATER

David W. Kramer, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed May 16, 1988, Ser. No. 195,285
Int. Cl.[4] A47J 27/00
U.S. Cl. 126—391 7 Claims



1. In a water heating apparatus, a tank to contain water to be heated, a hollow member disposed within the tank in contact with said water and defining a combustion chamber, burner means for burning a combustible mixture of fuel and air and having an outlet disposed in said combustion chamber, discharge means for discharging products of combustion from said chamber, and conduit means extending through said com-

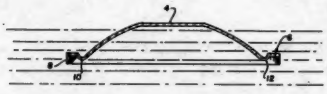
bustion chamber and having a pair of ends communicating with the interior of said tank, the interior of said conduit means being disposed out of communication with said combustion chamber and being constructed and arranged so that water from the tank will flow by convection through said conduit means, a portion of said conduit means being disposed in spaced direct alignment with said outlet, said portion being constructed and arranged to deflect said products of combustion outwardly toward the wall of said combustion chamber.

4,875,466

SOLAR HEATING DISC

Stephen Slonneger, 13176 Fenton, Sylmar, Calif. 91342

Continuation-in-part of Ser. No. 97,172, Sep. 16, 1987, abandoned. This application Oct. 24, 1988, Ser. No. 265,336
Int. Cl.[4] F24J 3/02
U.S. Cl. 126—415 2 Claims



1. A submersible solar heating apparatus for a unitary construction, including:

a. A dome-shaped unitary construction device comprised of polyethylene having a specific density ranging from 0.9202 to 0.9500 grams per cubic centimeter for collecting and transmitting through its mass solar energy for heating the water adjacent to said device, said device adapted to be deployed in the water so that a substantial portion thereof is immersed in the water and only the apex portion of said device is maintained above the water's surface; and,

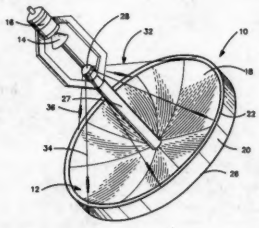
b. a channel section integrally formed with and along the periphery of said device to stabilize said device in the water.

4,875,467

SUPPORT AND MANEUVERING APPARATUS FOR SOLAR ENERGY RECEIVERS

Lawrence M. Murphy, Littleton, Colo., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 28, 1988, Ser. No. 225,444
Int. Cl.[4] F24J 2/38
U.S. Cl. 126—424 19 Claims



1. Support and maneuvering apparatus for solar energy receiving means for receiving and concentrating solar energy and having a central axis extending through the center thereof, said apparatus comprising:

frame means for mounting the perimeter of said solar energy receiving means and having front and rear perimeter edges;

a support member extending along the central axis of said receiving means and having a base end passing through the center portion of said receiving means and an outer distal end adapted for carrying solar energy receiving and conversion means;

first variable tension means interconnecting the distal end of said support member with said frame means and second variable tension means for interconnecting the base end of said support member with said frame means, said first and second variable tension means providing stiffening for said support member and said frame means and assisting in the alignment of said frame means to optimize the optical efficiency of said solar energy receiving means; and wherein said frame means comprises a pair of spaced stretched membranes mounted integrally therewith for receiving said solar energy, a position and tension of a first one of said pair of spaced stretched membranes being maintained by said first variable tension means, and a position and tension of the remaining stretched membrane being maintained by said second variable tension means;

a rotatable base member;

connecting means extending from said base member for pivotable attachment to said frame means at spaced positions therealong; and

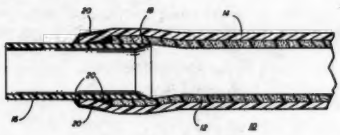
elevation means connected to said receiving means for selectively pivoting said receiving means about an axis defined between the attachment positions of said connecting means.

4,875,468

ELASTOMER-EPTFE BIOPSY CHANNEL

Allan I. Krauter, Syracuse, and Robert L. Vivenzio, Auburn, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,324
Int. Cl.[4] A61B 1/00
U.S. Cl. 128—3 7 Claims



1. A flexible channel which is liquid impervious comprising

a tubular inner liner of a flexible expanded polytetrafluoroethylene, having a predetermined inside diameter and outside diameter; and

a tubular outer sleeve of an elastomer, having a free inside diameter smaller than the outside diameter of the inner tube, and stretch fit over said inner liner.

4,875,469

CONTINUOUS PASSIVE MOTION DEVICES AND METHODS

Arthur H. Brook, Rolling Hills Estates; Peter J. Carian, Inglewood; Leonard Katzin, Beverly Hills; Edmund E. Landsinger, Torrance; James D. Moore, Rancho Palos Verdes; Leah D. Rotter, Los Angeles, and Stanley Schreiber, Marina Del Rey, all of Calif., assignors to Innovative Medical Engineering, Inc., Hawthorne, Calif.

Filed Jun. 13, 1988, Ser. No. 206,269
Int. Cl.[4] A61H 1/02
U.S. Cl. 128—26 23 Claims

5. A system for providing continuous passive motion of at least one of the fingers of the hand comprising:

a support for securing the system to the region of the wrist;

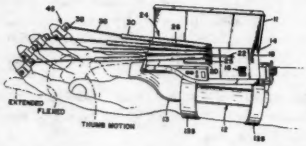
a housing rigidly coupled to the support for containing a drive mechanism, the housing including rigidly mounted motor means, battery means for energizing the motor

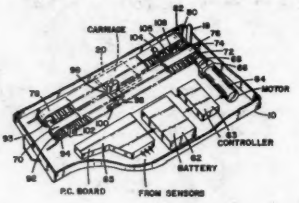
means, and controller means for varying the excitation of the motor means in speed and direction;

a pair of belt drives coupled to the housing, and movable with respect thereto, a first of the belt drives being coupled to the motor means by clutch means and a second of the belt drives being directly coupled to the motor means;

carriage means being slidably mounted on the housing and coupled to the first belt drive, the first and second belt drives and the carriage means being movable along a predetermined axis generally parallel to the direction of desired finger movement;

adjustable elongated means pivotably coupled to the carriage means and extending therefrom in the direction of





the finger tips parallel to the predetermined axis, and each of the adjustable elongated means including means for gripping a finger, such that motion of the motor means may be coupled to the adjustable elongated means so as to manipulate each gripped finger;

sensors means for sensing an anterior limit position of the second belt drive;

and wherein the controller means includes means for driving the motor means in reversing directions such that the belt drives move together between the anterior and posterior limit positions sensed by the sensor means when the clutch means is engaged so as to define a region of manipulation for each gripped finger.

4,875,470

RECIPROCATING ROLLING MASSAGER WITH VARYING PRESSURE AND VARYING WHEEL PLACEMENT

Cris A. Cotone, 5708 Buena Vista Ter., Eagle Rock, Calif. 90042

Filed Apr. 20, 1988, Ser. No. 183,787

Int. Cl.[4] A61H *15/00, 9/00*

U.S. Cl. 128—57 **15 Claims**

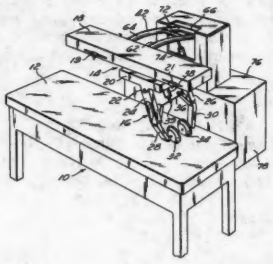
1. A device for massaging an anatomical portion of the body, said device comprising:

a body supporting surface;

an axially reciprocable carriage means positioned generally above said body supporting surface and operative to reciprocate axially relative thereto;

a massaging assembly attached to and extending downwardly from said carriage means, said massaging assembly including at least one body contacting means operative to exert pressure upon a body portion positioned upon said body supporting surface while reciprocating axially in conjunction with said carriage means;

at least one pressure sensing limit switch operatively associated with the body contacting means, said body contacting means being downwardly biased at a desired maximum pressure limit such that when said maximum pressure limit is exceeded by the device, the downward bias-



ing of the body contacting means will be overcome so as to thereby result in closure of said at least one pressure sensing limit switch.

4,875,471

DEVICE FOR CORRECTING DEFORMITIES OF THE SPINE

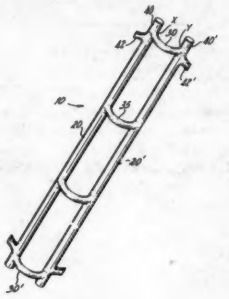
Carlos Lea Plaza, Montevideo, Uruguay, assignor to Codespi Corporation, Fla.

Continuation-in-part of Ser. No. 17,050, Feb. 20, 1987, Pat. No. 4,738,251. This application Mar. 14, 1988, Ser. No. 167,914

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[4] A61B *17/56*

U.S. Cl. 128—69 **4 Claims**



1. A device for stabilizing and correcting deformations of the spine being surgically mountable over the vertebrae and said correction includes bringing the spine back to its center line de-rotated, comprising:

A. two elongated rigid members parallel to each other and each member having two ends:

B. two curved rigid members rigidly mounted to said elongated members so that said elongated members are kept in a spaced apart relationship from each other and said elongated and curved members form a rigid rectangular frame and said curved rigid members mounted at a point slightly separated from said ends;

C. two hook members mounted on the outer periphery of said elongated members substantially towards the ends of said elongated members and adjacent to where said curved member is mounted on said elongated member;

D. a curved spacer member having a curved shape and rigidly mounted between said elongated members thereby

reinforcing the structural integrity of said frame, said curved rigid members and said curved spacer member being smoothly curved for the entirety of their extent between said elongated members;

E. wire means for tying said device to the vertebrae by using said hook members and said ends of said elongated members as anchorage points.

4,875,472

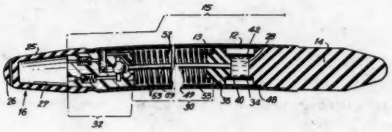
FLAT COIL SPRING PENILE PROSTHESIS

Dezso K. Levius, Bloomington, Minn., assignor to American Medical Systems, Inc., Minnetonka, Minn.

Filed Dec. 10, 1987, Ser. No. 131,364

Int. Cl.[4] A61F *2/26*

U.S. Cl. 128—79 **9 Claims**



1. A penile prosthesis comprising:

at least one cylinder within at least one corpus cavernosum of the penis, said cylinder(s) having a distal portion for mounting in the distal portion of said penis and a proximal portion for mounting in the proximal portion of said penis;

at least one flat coil spring contained in a spring section of said cylinder(s), said spring section lying substantially at or distal to the junction of said distal and said proximal portion of said cylinder(s); and

means for reversibly compressing and relaxing said flat coil spring such that said cylinder(s) can be reversibly changed between a rigid and a flaccid state.

4,875,473

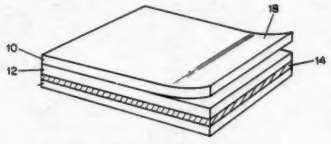
MULTI-LAYER WOUND DRESSING HAVING OXYGEN PERMEABLE AND OXYGEN IMPERMEABLE LAYERS

Oscar M. Alvarez, East Brunswick, N.J., assignor to Bioderm, Inc., N.J.

Filed Apr. 3, 1986, Ser. No. 847,934

Int. Cl.[4] A61F *13/00, 15/00*

U.S. Cl. 128—155 **9 Claims**



1. A multi-layer wound dressing comprising:

(a) an outer layer of a continuous film material having low-oxygen permeability and capable of creating a hypoxic environment thereunder;

(b) an inner layer of an oxygen permeable continuous film material sized to entirely cover a wound said outer layer being affixed to one side of the inner layer; and

(c) an adhesive applied to at least a part of the other side of the inner layer, said adhesive being such that when the dressing is applied the adhesion of the inner layer to skin is greater than the adhesion of the inner layer to the outer layer.

4,875,474

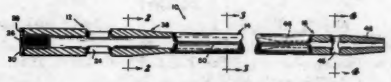
VARIABLE WALL THICKNESS INTERLOCKING INTRAMEDULLARY NAIL

Robert Border, Bourbon, Ind., assignor to Biomet, Inc., Warsaw, Ind.

Filed Jan. 29, 1988, Ser. No. 150,025

Int. Cl.[4] A61B *17/58*

U.S. Cl. 128—92 Y **7 Claims**



1. An intramedullary nail, comprising a proximal portion, a distal portion and an intermediate portion between the proximal and distal portions, and having at least one opening extending transversely through at least one of said proximal and distal portions, said nail being formed of a unitary piece of elongate material of tubular cross-section having variations in wall thickness along its length, wherein the wall thicknesses of the proximal and distal portions are substantially greater than the wall thickness of the intermediate portion.

4,875,475

DEVICE FOR TREATING A BONE

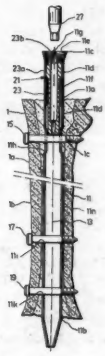
Pierre-André Comte, Pully; Hans Schürch, Titterten, both of Switzerland, and Gebhard Ritter, Mainz-Finthen, Fed. Rep. of Germany, assignors to Synthes (U.S.A.), Paoli, Pa.

Filed Dec. 2, 1985, Ser. No. 803,953

Claims priority, application Switzerland, Nov. 30, 1984, 5720/84

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—924 Y **22 Claims**



1. Device for treating a bone having a fracture, said device comprising an elongated intramedullary nail having a longitudinal axis for insertion into the medulla of the bone across the bone fracture, said nail having a hollow first terminal segment at one end and a second terminal segment at the other end a longitudinal slot in the first terminal segment for receiving a retaining member extending generally transverse to the longitudinal axis, a hole in the second terminal segment for receiving a retaining member generally transverse to the longitudinal axis, and an adjusting member within said hollow first terminal segment for applying a force axially of the nail to a retaining member inserted in said slot in said first terminal segment, said first terminal segment having an internal thread and said adjusting member having an external thread to engage the internal thread of said first terminal segment, and a tool engaging

means on said adjusting member for rotating said adjusting member to advance said adjusting member axially of the nail.

4,875,476

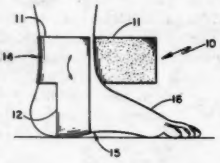
ANKLE SUPPORT BANDAGE FOR PREVENTION OF ANKLE INJURY

Mario C. Garcia, West St. Paul, Minn., assignor to Prevent Products, Inc., St. Louis Park, Minn.

Continuation-in-part of Ser. No. 936,454, Dec. 1, 1986, abandoned. This application Feb. 22, 1988, Ser. No. 158,559

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—157 4 Claims



1. Adhesive-backed tape means for providing temporary support to the ankle of a human and comprising:

(a) a generally "L"-shaped support bandage of two wide generally elongated strips of adhesive-backed tape fixedly arranged in generally right angular relationship, one to the other and with said adhesive backing being substantially uniform and extending across the entire extent of said two elongated strips;

(b) means for adhesively securing a first of said wide strips beneath the arch of the foot of the patient, and with each end, including the free end thereof, extending to and covering a portion of the ankle; and

(c) means for adhesively securing the other of said wide elongated strips about the ankle so as to overlie said free end and adhesively bond said free end onto the ankle of the patient.

4,875,477

PROTECTIVE MASK HAVING A BUILT-IN SENSOR FOR MONITORING VITAL FUNCTIONS

Christine Waschke, Lübeck; Lothar Töpfer, Ratingen, and Alfred Rath, Hamberge, all of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Jun. 27, 1988, Ser. No. 211,966

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724336

Int. Cl.[4] A62B *18/02, 18/08;* A61B *5/02*

U.S. Cl. 128—206.21 4 Claims

1. Arrangement for monitoring vital functions, the arrangement comprising:

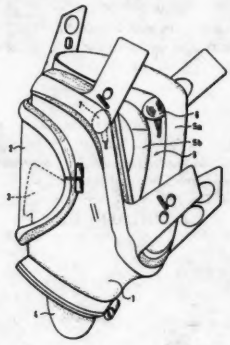
a breathing protective mask having an inner surface facing a wearer thereof;

a sensor for sensing a vital function of the wearer when held in contact engagement with the head of the wearer;

said mask having sealing rim means for defining an uninterrupted seal with the head of the wearer of said mask;

cavity means disposed completely within said sealing rim means so as to ensure the integrity of said seal; and,

said cavity means being formed in said sealing rim means and said sensor being held in said cavity means only by said sealing rim means so as to cause said sensor to be in firm



contact engagement with the head of the wearer when the mask is worn.

4,875,478

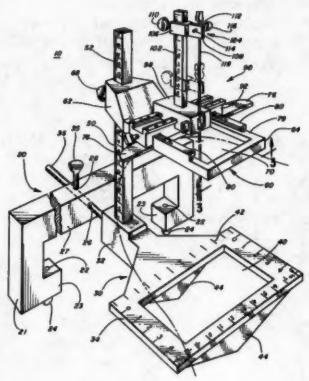
PORTABLE COMPRESSION GRID & NEEDLE HOLDER

Harry H. Chen, 215 E. Chicago Ave., Chicago, Ill. 60611

Continuation of Ser. No. 36,870, Apr. 10, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 333,760

Int. Cl.[4] A61B *6/00*

U.S. Cl. 128—303 B 21 Claims



1. A portable compression apparatus for radiologically and graphically locating breast lesions along three dimensional coordinates to facilitate cytological examination and treatment thereof, comprising:

means for mounting said apparatus on the film cassette holder plate of a dedicated mammography unit,

a top radiolucent compression plate having a cut-out area and a first rectilinear grid scale around the periphery of said cut-out area,

a bottom radiolucent support plate having a second rectilinear grid scale around the periphery thereof, said bottom plate being rotatably and removably connected to said mounting means,

first means for supporting said top plate and for adjustably positioning said top and bottom plates one relative to the other on either side of said breast; said first and second grid scales constructed and arranged to enable formation

of corresponding grid scales on the resulting radiograph, which corresponding grid scales, in conjunction with the representation of the lesion also on said radiograph facilitate subsequent direct graphical representation of the location of said lesion relative to said coordinates within said breast,

a needle holder and guide assembly adapted to hold a needle for inserting the tip thereof into the lesion, said assembly being adjustable in its position relative to the lesion to enable accurate and reliable insertion of said tip,

means providing support and guidance for said needle along two spaced points of the needle to prevent deflection thereof during insertion of said needle tip,

said needle holder assembly including first parallel rails on said top plate having calibrations thereon for adjusting the position of said assembly in the Y direction, a first sliding base mounted transversely on said first rails, said first base having second parallel rails mounted longitudinally thereon and having calibrations thereon for adjusting the position of said assembly in the X direction; a second sliding base mounted transversely on said second rails, and second base having a rod extending vertically therefrom, said rod having calibrations and a slidable needle holder thereon, said calibrations and slidable needle holder for adjusting the position of said assembly in the Z direction; said second sliding base including a releasable bushing having a lumen through which said needle extends, said bushing and said slidable needle holder providing support and guidance for said needle, said second base and said needle holder also permitting release of said needle from said apparatus while maintaining said needle tip at said location.

4,875,479

SUTURAL MATERIAL

Sergei I. Belykh; Anatoly B. Davydov, both of Moscow; Anatoly D. Moschensky, Malakhovka; Nikolai N. Kanshin; Igor L. Kovalenko, both of Moscow; Jury B. Kirillov, Ryazan; Gennady I. Osipov, and Rustam I. Utyamyshev, both of Moscow, all of U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky I Ispytatelny Institut Meditsinskoi Tekhniki, Moscow, U.S.S.R.

PCT No. PCT/SU86/00072, § 371 Date Feb. 19, 1988, § 102(e) Date Feb. 19, 1988, PCT Pub. No. WO88/00062, PCT Pub. Date Jan. 14, 1988

PCT Filed Jul. 4, 1986, Ser. No. 191,149

Int. Cl.[4] F24C *15/16*

U.S. Cl. 128—335.5 **2 Claims**

1. A suture material comprising a base thread of a bioresolvable polymer having deposited thereon a coating comprising a mixture of at least one antimicrobal preparation and a copolymer of N-vinylpyrrolidone with at least one composition selected from the group consisting of alkylacrylate and alkylmethacrylate the coating having a period of biodestruction shorter than the period of biodestruction of the base, and wherein the thickness of coating being equal to 0.1 to 1.0 of the base thread thickness.

4,875,480

DEVICE FOR TRANSLUMINAL IMPLANTATION

Christian Imbert, Preverenges, Switzerland, assignor to Medinvent S.A., Lausanne, Switzerland

Filed Sep. 25, 1987, Ser. No. 100,784

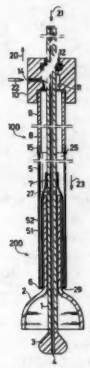
Claims priority, application Sweden, Sep. 30, 1986, 8604145

The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.

Int. Cl.[4] A61M *25/00*

U.S. Cl. 128—343 **20 Claims**

1. A device for implantation by insertion into a difficulty accessible location of a substantially tubular, radially expansible prosthesis, including in combination said radially expandable prosthesis surrounding and concentric with a flexible probe and means for maintaining said prosthesis in a radially contracted state and for releasing said expandable prosthesis in the difficulty accessible location, said means for maintaining and releasing the prosthesis comprising a hose concentrically surrounding said probe and radially surrounding the prosthesis to form a compartment therefor with one end of the hose being



connected to the probe, wherein the probe has a central axial channel enabling supply of a liquid flushing medium at one end and the probe is provided with at least one radial aperture opening into a compartment of the prosthesis to enable flushing of the prosthesis compartment to remove gases therefrom before implantation of the prosthesis.

4,875,481

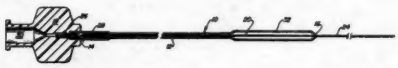
CATHETER WITH COILED WIRE ATTACHMENT

Sheryl W. Higgins, Plantation, Fla., assignor to Cordis Corporation, Miami Lakes, Fla.

Filed Jul. 1, 1988, Ser. No. 214,171

Int. Cl.[4] A61M *29/02*

U.S. Cl. 128—344 **13 Claims**



1. In a catheter having a longitudinally extending steering wire therein and a catheter hub positioned on an end of said catheter, the improvement comprising, in combination:

said hub defining a bore, said wire defining a generally straight portion comprising most of the length of said wire and a coiled end unitary with said straight portion and positioned within said bore and secured to said hub, whereby fluids can flow through said bore and coiled wire end to and from said catheter.

4,875,482

FLEXIBLE GRASPING DEVICE

Robert J. Hariri; Jamshid B. G. Ghajar, and Fathali Ghahremani-Ghadjar, all of New York, N.Y., assignors to Neurodynamics, Inc., New York, N.Y.

Filed Jun. 21, 1988, Ser. No. 209,434

Int. Cl.[4] A61B *17/42*

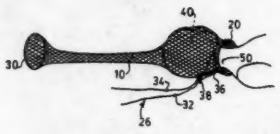
U.S. Cl. 128—352 **25 Claims**

1. An obstetric device for the tractive delivery of a fetus comprising:

an elongated cylindrical net-like structure having a plurality of interconnected threads defining a plurality of openings;

a resilient, constrictable and expandable guide member at-

tached at a first end of said cylindrical net-like structure for inserting said device through a birth canal and defining an opening of said net-like structure for receiving and enveloping a fetal head and guiding said cylindrical net-like structure therearound, said guide member being a ring which maintains said first end of said a net-like structure



open at said opening and has a diameter at rest slightly larger than the diameter of the fetal neck;

wherein said first end of said elongated net-like structure applies an increased grasping force to a fetal head inserted therein as tractive force is applied to a second end of said elongated cylindrical net-like structure.

4,875,483

IMPLANTABLE CARDIAC PACER WITH PROGRAMMABLE ANTITACHYCARDIA MECHANISMS

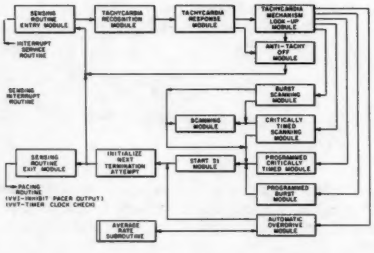
William Vollmann, N. Lauderdale, and Van E. Mumford, Miami, both of Fla., assignors to Telectronics, N.V., Netherlands Antilles, Netherlands Antilles

Continuation of Ser. No. 774,028, Oct. 15, 1985, Pat. No. 4,726,380, which is a division of Ser. No. 542,889, Oct. 17, 1983, Pat. No. 4,561,442. This application Dec. 17, 1987, Ser. No. 134,464

The portion of the term of this patent subsequent to Feb. 23, 2005, has been disclaimed.

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 PG **2 Claims**



1. An implantable cardiac stimulator, comprising:

an electrical terminal for connection to cardiac tissue;

sensing means connected to said terminal for producing a sense output indicative of cardiac activity;

output means connected to said terminal for applying a stimulation pulse via said terminal on command;

storage means containing selectable, programmable antitachycardia parameters representative of a sequence of stimulation commands and corresponding to either programmed burst, burst rate scanning, automatic overdrive, programmed critically timed, or critically timed scanning;

means for executing the selected sequence of stimulation commands stored in said storage means;

means for setting a programmable tachycardia threshold rate;

tachycardia detection means for issuing an arrhthymia output signal when the tachycardia threshold rate is exceeded a given number of times; and

antitachycardia means responsive to the arrhthymia output signal for causing said storage means under control of the executing means to apply the programmable sequence of stimulation commands to said output means.

4,875,484

METHOD FOR GENERATING A LOW FREQUENCY ELECTRIC STIMULUS SIGNAL AND LOW FREQUENCY ELECTRIC STIMULUS SIGNAL GENERATING APPARATUS

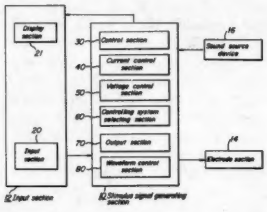
Hiroshi Anzai, and Atsunori Futsuki, both of Tokyo, Japan, assignors to Total Human Medical Laboratory Co., Ltd., Tokyo, Japan

Filed Sep. 30, 1987, Ser. No. 103,010

Claims priority, application Japan, Oct. 4, 1986, 61-236700; Oct. 8, 1986, 61-239632; Oct. 8, 1986, 61-239633; Oct. 8, 1986, 61-239634; Oct. 8, 1986, 61-239635; Oct. 8, 1986, 61-239637; Oct. 8, 1986, 61-239638

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—421 **66 Claims**



1. A method of providing electrical stimulus to a biological body, comprising the steps of:

generating a low frequency electrical signal;

frequency modulating either the current or voltage, or both, of the low frequency signal with frequencies corresponding to respective sound volume levels supplied by a sound source to stimulate the body.

4,875,485

MAGNETIC RESONANCE SYSTEM

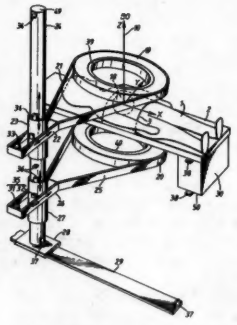
Kinya Matsutani, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 931,187, Nov. 17, 1986, abandoned. This application Apr. 19, 1988, Ser. No. 186,709

Claims priority, application Japan, Nov. 18, 1985, 60-257937

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—653 **10 Claims**



1. A magnetic resonance system comprising:

a pair of magnets for generating a static field;

a plurality of gradient coils for generating plural gradient fields to be superimposed on said static field;

an RF coil for stimulating nuclei and for measuring field changes caused by said stimulation;

a platform for holding a body to be examined by placing said body thereon, within said static field;

driving means for automatically varying the position of each magnet independently and for varying a positional relationship between said magnets and said platform such that a field-homogeneous space can be established at an arbitrary position of said body to be examined; and

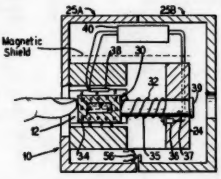
controlling means for automatically controlling said driving means, said gradient coils and said RF coil for measuring at least one of spin density distributions, relaxation time constant distributions and spectra, and for storing said measurements together with associated positional information corresponding to the respective portions within said body to be examined, and for providing cross-sectional images by synthesizing said stored data.

4,875,486

INSTRUMENT AND METHOD FOR NON-INVASIVE IN VIVO TESTING FOR BODY FLUID CONSTITUENTS

Uri Rapoport, Oak Park, and Richard Panosh, Lisle, both of Ill., assignors to Advanced Techtronics, Inc., Downers Grove, Ill.

Filed Sep. 4, 1986, Ser. No. 904,000
Int. Cl.[4] A61B *5/05*
U.S. Cl. 128—653 **31 Claims**



1. In a nuclear magnetic resonance spectroscopy apparatus for testing body fluids for the presence of constituents, said apparatus being of the type in which a first magnetic field aligns ^1H protons to an intial position, and in which a second magnetic field is cyclicly energized and deenergized to cause alignment of the ^1H protons to a second position and realignment to said intial position, and in which the magnetic changes resulting during realignment are detected and analyzed, the improvement comprising:

first magnet means comprising a pair of permanent bar magnets each including a north pole and a south pole,

second magnet means for creating said second magnetic field;

mounting means for mounting said first magnet means,

said mounting means comprising a pair of spaced apart members for positioning said pair of bar magnets spaced apart with the north pole of each said bar magnet secured to one of said members and the south pole of each said bar magnet secured to the other of said members, said first magnet means, said second magnet means and said mounting means providing a cavity defining a test region therein for receiving a sample of the body fluid to be tested,

said first magnetic field being substantially uniform in field strength and direction throughout said test region;

said second magnet means being operatively disposed with respect to said test region for being magnetically coupled to the body fluid sample to be tested;

first and second members connecting said pair of spaced apart members, said first connecting member including an aperture therethrough for access of said body fluid sample into said test region;

circuit means for detecting and analyzing said magnetic changes;

said second connecting member having switch means operatively associated therewith for initiating operation of said circuit means;

a sample holder containing a standard sample of known concentrations of the constituents to be investigated;

said standard sample holder being intially disposed in said test region; and

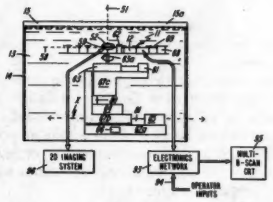
means for biasing said sample holder to urge said sample holder toward said second connecting member and to initially locate said standard sample in said test region and capable of being operatively coupled to said second magnet means when said second magnet means is energized, said switch means being activated in response to the movement of said standard sample holder out of said test region to contact and operate said switch means when said body fluid sample to be tested is moved into said test region.

4,875,487

COMPRESSIONAL WAVE HYPERTHERMIA TREATING METHOD AND APPARATUS

Edward J. Seppi, Menlo Park, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed May 2, 1986, Ser. No. 860,281
Int. Cl.[4] A61B *8/00*; A61N *5/00*
U.S. Cl. 128—660.03 **15 Claims**



1. A method of treating a region of a subject with compressional wave energy derived from an array of ultrasonic transducers having a focused far field and a wide band pass frequency response and for analyzing matter of the subject in the path between the transducers and the region comprising the steps of from time to time exciting the transducers with pulse like ultrasonic electric energy having substantial frequency components in the band pass of the transducers, the transducers being excited while the region is in the focused far field of the array, the frequency and the transducer response being such that said frequency components are incident on the subject during said exciting step, the pulse like ultrasonic compressional wave energy from said transducers being reflected from certain regions internally of the subject back to the transducers while the transducers are no longer excited by the pulse like electric energy whereby the transducers derive electric signals having time positions and amplitudes together enabling information about different volumes in the subject between the array and the region to be determined, responding to the time positions of the derived electric signals to display the information, and supplying many cycles of treating hyperthermia ultrasonic electric energy to the transducers in the treating period between tow consecutive periods when the pulse like electric energy is exciting the transducers and the electric signals are being derived, the many cycles of ultrasonic electric energy being periodically disrupted for at least several cycles thereof and being supplied to the transducers while the region is in the focused far field and causing the transducers to be excited to derive in the subject many cycles of treating hyperthermia ultrasonic compressional wave energy having a frequency in the band pass of the transducers and having a duty cycle less than one, said method including the step of varying

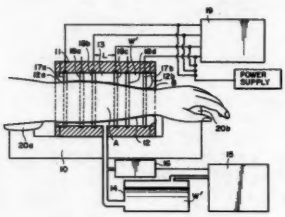
the duty cycle and amplitude of the compressional wave energy of at least one of said transducers in an inverse manner.

4,875,488

SYSTEM FOR MEASURING THE VOLUME OF A PART OF A HUMAN BODY

Hideaki Shimazu, Tokyo; Hiroshi Ito, Kokubunji, and Kenichi Yamakoshi, Hokkaido, all of Japan, assignors to Takashi Inoue and Kabushiki Kaisha Nihon M.D.M., both of Tokyo, Japan

Filed May 2, 1988, Ser. No. 188,997
Claims priority, application Japan, May 13, 1987, 62-116335
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—694 **9 Claims**



1. A system for measuring the volume of a part of a human body, comprising:

an outer tube made of a rigid insulation material;

an inner tube made of a flexible insulation material and secured to an interior wall portion of said outer tube at both ends thereof so as to form a tubular portion therein which defines an annular watertight chamber between said interior wall portion of said outer tube and an interior wall portion of said inner tube;

a plurality of electrodes provided upon said interior wall portion of said outer tube at locations spaced along an axial direction of said system;

electrically conductive liquid provided within said watertight chamber;

means for conducting current through said conductive liquid by means of a first pair of said axially spaced electrodes selected from said plurality of electrodes provided upon said interior wall portion of said outer tube; and

means for detecting voltage across a second pair of said axially spaced electrodes selected from said plurality of electrodes provided upon said interior wall portion of said outer tube,

whereby when said part of a human body is inserted within said tubular portion of said inner tube and compresses part of said flexible inner tube and said electrically conductive liquid provided within said watertight chamber thereof, an impedance change in said electrically conductive liquid, indicative of said volume of said part of a human body to be measured, can be determined by said voltage detecting means from said voltage across said second pair of axially spaced electrodes.

4,875,489

EXTENDABLE GUIDEWIRE

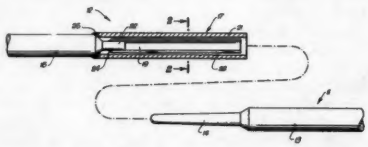
Kirsten L. Messner, Belmont; Robert M. Abrahms, Mountain View, and Ray R. Beitelia, Santa Clara, all of Calif., assignors to Advanced Cardiovascular Systems, Inc., Mountain View, Calif.

Filed Aug. 14, 1987, Ser. No. 86,102
Int. Cl.[4] A61B *5/00*
U.S. Cl. 128—772 **5 Claims**

1. An extendable guidewire system adapted for use within a patient's vasculature comprising:

a first guidewire section having secured at one end thereof an expandable inner tubular portion with a longitudinal slot therein and an outer tubular member surrounding the inner tubular portion which restricts the expansion of the inner member; and

a second guidewire section having a male end portion which



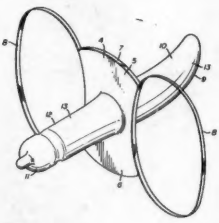
is adapted to be inserted into the tubular portion of the first guidewire section with the longitudinal slot therein to expand the slotted tubular portion and which has a diametrical dimension larger than the diameter of the slotted tubular member and thereby detachably securing the two wire sections together.

4,875,490

INTRAVAGINAL DEVICE

Roberto Quiroz, 341 Lucerno La., El Paso, Tex. 79917

Filed Sep. 6, 1988, Ser. No. 240,805
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—830 **4 Claims**



1. An intravaginal device comprising an elongated and elastic closed bag, one end of said bag fitting into the female vagina and covering the surface of the vagina during sexual intercourse, a second end of the said elongated, elastic bag being the size and shape of a standard condom, said second end initially extending outside of the vagina and its exterior surface and covering the penis as it enters the vagina.

4,875,491

CONDOM-HOLDER DEVICE

Tony Parrone, 3604 67th St., Kenosha, Wis. 53140

Filed Mar. 23, 1988, Ser. No. 172,284
Int. Cl.[4] A61F *5/44*
U.S. Cl. 128—844 **7 Claims**

1. A condom-holder device of the type having a condom extendible to cover the male organ comprising:

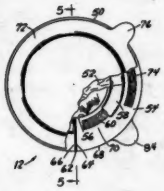
an unextended condom having a gathered annular portion;

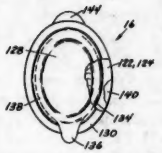
a pair of walls which define a space therebetween containing the unextended condom and have substantially aligned annular edges, at least a portion of one of the walls being removable from the other wall to open said condom-containing space;

means attaching the aligned annular edges of the walls to enclose said space;

body-securement adhesive along the aligned annular edges in position about said space for securement to the human body within manual reach; and

means to removably cover said body-securment adhesive prior to securement to the human body,





whereby the condom may be reached and applied to the male organ with one hand without substantial interruption of activity.

4,875,492

WASHABLE AND CONTOURED NURSING PADS

Debra J. Mitchell, 1052 Windjammer Cir., Foster City, Calif. 94404, and Cheryl L. Ranzau, 1073 Laurie Ave., San Jose, Calif. 95125

Filed May 5, 1988, Ser. No. 190,666
Int. Cl.[4] A61F *13/14*
U.S. Cl. 128—890 **1 Claim**

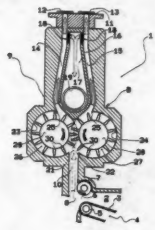
1. A washable and contoured nursing pad comprising a lace outer layer of a polyester lace with a rough side of the lace facing outward to prevent slipping inside the wearer's bra, a waterproof second layer which is comprised of a polyester tricot that is coated with 2.5 to 4 millimeters of opaque polyvinylchloride, a fluid absorbent third layer which is comprised of an 8 to 10 ounce needle punched felt blend of rayon and polyester, and a soft, and a comfortable inner layer adapted to be against the skin which is comprised of brushed polyester flannel and has a wicking quality which draws fluid through to the needle punched absorbent layer.

4,875,493

DEVICE FOR FEEDING STREAMS OF TOBACCO ON TO A CIGARETTE MANUFACTURING MACHINE

Riccardo Mattei, and Franco Ghini, both of Bologna, Italy, assignors to G. D. Societa' Per Azioni, Bologna, Italy

Filed Oct. 12, 1988, Ser. No. 256,711
Claims priority, application Italy, Oct. 20, 1987, 3660 A/87
Int. Cl.[4] A24C *5/14*
U.S. Cl. 131—84.1 **8 Claims**



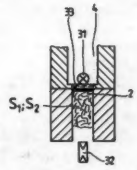
1. A device for feeding streams of tobacco on to a cigarette manufacturing machine (1), said device (9) comprising an up-flow input duct (10), two up-flow output channels (14, 15), a chamber (22) connecting the top end of said input duct (10) to the bottom end of each said output channel (14, 15), and a device (A or B) for dividing the input tobacco stream flowing up said input duct (10) into two output streams, and feeding each said output stream to a respective said output channel (14, 15); characterised by the fact that said separating device (A or B) comprises two conveyors (26, 27) in the vicinity of said chamber (22), each located between the top end of said input duct (10) and the bottom end of a respective said output channel (14, 15); both said conveyors (26, 27) presenting tobacco transporting means (29 or 30) substantially closing off the top end of said input duct (10), and travelling in the same direction and at substantially the same speed as the tobacco flowing up said input duct (10).

4,875,494

METHOD OF AND APPARATUS FOR MAKING A ROD OF FIBROUS MATERIAL

Wolfgang Siems, Hamburg, Fed. Rep. of Germany, assignor to Körber, Hamburg, Fed. Rep. of Germany

Filed Feb. 5, 1988, Ser. No. 152,951
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1987, 3705576
Int. Cl.[4] A24C *5/14, 5/39*
U.S. Cl. 131—84.1 **31 Claims**



1. A method of converting into a rod a surplus-containing stream of fibrous material wherein the quantity of surplus fluctuates, comprising the steps of forming signals each having at least one variable characteristic which is indicative of fluctuations of the surplus in a portion of the stream; regulating the quantity of the surplus in the stream as a function of said variable characteristics of the signals including increasing the

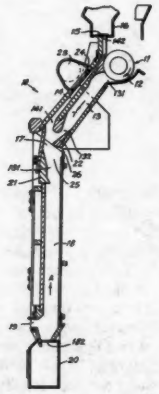
quantity of surplus when the fluctuations increase and reducing the quantity of surplus when the fluctuations decrease; and thereafter removing the surplus from the stream.

4,875,495

SEPARATION OF LIGHT PARTICLES FROM HEAVY PARTICLES IN A STREAM OF PARTICULATE MATTER

Jack C. Wheless, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Aug. 14, 1987, Ser. No. 85,868
Int. Cl.[4] A24C 5/39
U.S. Cl. 131—110 7 Claims



1. Apparatus for separating heavy particles from light particles in a stream of particulate matter, said apparatus comprising:

a first elongated chamber into which said stream containing said light and heavy particles is introduced and in which said stream travels generally in the direction of gravity, said first elongated chamber having a first end and a second end;

a second elongated chamber in which said light particles travel against the direction of gravity and from which said heavy particles are substantially absent, said second elongated chamber having a first end and a second end;

a third elongated chamber in which said heavy particles and a first portion of said light particles travel generally in the direction of gravity and in which a second portion of said light particles travels against the direction of gravity, said third elongated chamber having a first end and a second end;

a fourth chamber at which said second end of said first elongated chamber, said first end of said second elongated chamber, and said first end of said third elongated chamber communicate with one another; and

means adjacent said second end of said third elongated chamber for providing a stream of fluid in said chamber, said stream for fluid being accelerated against the direction of gravity, such that particles in said third chamber are subject to acceleration by said stream of fluid against the direction of gravity at substantially all times during their passage through said third chamber; whereby:

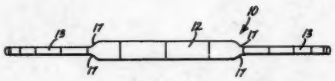
said stream of fluid causes reversal of the momentum of a third portion of said light particles exiting said first elongated chamber into said fourth chamber such that said third portion of said light particles enters said first end of said second elongated chamber, and causes reversal of the momentum of substantially all of said first portion of said light particles as said first portion of said light particles travels toward said second end of said third elongated chamber such that substantially all of said first portion of said light particles become said second portion and travel toward said fourth chamber and into said second elongated chamber, said heavy particles exiting said second end of said third elongated chamber beyond said fluid stream providing means.

4,875,496

ORAL HYGIENE TOOL

Israel Prabhudass, Box 1173, Fort St. James, B.C., Canada (V0J 1P0)

Filed Jun. 30, 1988, Ser. No. 213,635
Int. Cl.[4] A61C 15/00
U.S. Cl. 132—329 1 Claim



1. An oral hygiene tool apparatus comprising,

an elongate arcuate flexible strip of uniform thickness formed of memory retentent material, and

said strip formed with a central blade of a first width positioned centrally of said arcuate flexible strip, and

a handle of a plurality of handles integrally formed to said blade on each end of said blade, and

each of said handle blending into said blade by means of a convex transitional surface to eliminate projections on said apparatus and minimize injury to a tongue when said apparatus is pulled over said tongue, and

wherein said arcuate flexible strip is formed with a continuous convex upper surface and a continuous concave lower surface, and

wherein each handle is of equal length, and

wherein the uniform thickness of said strip is defined between said upper and lower surfaces, and wherein opposed parallel side surfaces of said blade and opposed parallel side surfaces of said handle and said surfaces of said blade are orthogonally oriented relative to said upper and lower surfaces, and wherein said side surfaces of said handle are of a lesser width than said side surfaces of said blade, and

wherein said flexible strip is accommodated within a cavity of a toothbrush, said cavity is of a thickness equal to said thickness of said arcuate flexible strip, and

wherein said strip further includes a first tip of a width greater than said width of said blade and said first tip is equal to said width of said cavity, and

wherein said strip is formed with a second strip integrally secured to a distal terminal end of said strip opposed to said first tip wherein said second tip is of a width greater than said first tip and of a width equal to a width defined by said toothbrush to present a grasping surface externally positioned of said cavity.

4,875,497

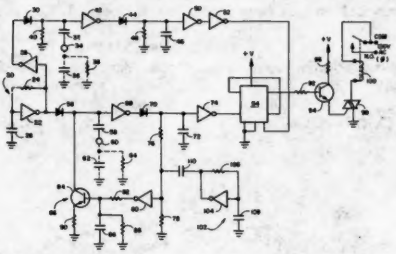
CAPACITANCE LIQUID LEVEL SENSING AND TOUCH CONTROL SYSTEM

Ralph T. Worthington, 4733 Mt. St. Helens Ct., San Diego, Calif. 92117

Filed Apr. 23, 1984, Ser. No. 602,763
Int. Cl.[4] G01F 23/26; F16K 31/02
U.S. Cl. 137—2 33 Claims

16. A method of sensing the volume of a conductive liquid having some isolation from ground and a capacitance to ground in accordance with its volume, comprising the steps of cyclically charging the liquid a predetermined amount and then discharging the liquid for a substantially fixed period of time through an impedance, the liquid being discharged by an amount in accordance with its capacitance to ground; sensing

the amount of discharge of the liquid; and generating an indicator signal having a value in accordance with the sensed amount



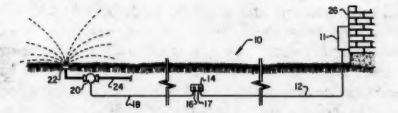
of discharge of the liquid, and therefore in accordance with the volume of the liquid.

4,875,498

IRRIGATION MANAGER SYSTEM WITH ZONE MOISTURE CONTROL

T. Arthur Andrews, 1600 E. Lamar Blvd., #112, and D. Glenn Gibson, 1908 E. Randol Mill, #208, both of Arlington, Tex. 76011

Filed May 2, 1989, Ser. No. 345,902
Int. Cl.[4] A01G *25/16*
U.S. Cl. 137—78.3 **17 Claims**



1. Moisture manager apparatus for independently managing the amount of moisture in respective zones of earth included within a plot of land being irrigated, said apparatus comprising:

(a) a monolithic electrical earth resistance detection body installed within the earth in a designated zone, said body being hermetically sealed against intrusion of liquids and air;

(b) said body having two electrical detection electrodes mounted to extend out of said body into intimate contact within the earth;

(c) said body having a first pair of electrical input connectors connected to receive AC electrical power from a central controller connected to control other said bodies in other said designated zones;

(d) said body having a second pair of electrical output connectors connected to supply electrical AC voltage to irrigating valve means;

(e) said body including a bipolar electrical resistance detection circuit means mounted on a printed circuit base and connected to said detection electrodes and to said input connectors, said detection circuit means being adapted to oscillate at frequencies governed by a fixed reference resistor and a varying resistance detected through the earth between said detection electrodes, said varying resistance being a function of water present in said earth;

(f) said body containing a switch relay means mounted on said base and connected to said integrated circuit and operative in response to the output of said detection circuit to open and to close said switch relay;

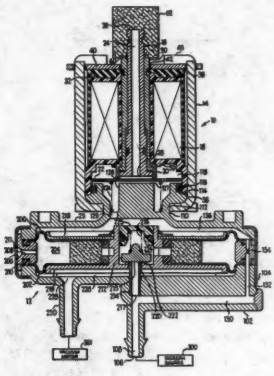
(g) said body being formed of a heat-hardenable liquid plastic poured in and around said detection electrodes, said input connectors, said output connectors, said integrated circuit, and said switch relay wherein the liquid plastic becomes hardened in place into an integral and monolithic solid body.

4,875,499

PROPORTIONAL SOLENOID VALVE

Clarence D. Fox, Decatur, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Division of Ser. No. 761,906, Aug. 2, 1985, Pat. No. 4,715,396, which is a continuation of Ser. No. 645,191, Aug. 29, 1984, Pat. No. 4,534,375, which is a continuation of Ser. No. 349,488, Feb. 17, 1982, which is a continuation-in-part of Ser. No. 311,820, Oct. 16, 1981, abandoned. This application Sep. 30, 1987, Ser. No. 102,998
Int. Cl.[4] F16K *31/06*; F15C *3/00*
U.S. Cl. 137—82 **33 Claims**



1. An electromechanical valve apparatus comprising:

an electrical winding defining a central flux axis;

a magnetic flux circuit defining a flux path comprising a plurality of adjacent magnetic segments, including a generally cylindrical center segment which defines a fluid passage of predetermined cross sectional area aligned with said flux axis, and outer segment, and an end segment adjacent a first end of said fluid passage, at least one of said segments being physically translatable within said valve apparatus along said flux path relative to an adjacent segment to adjust the portion of one of said segments that is in said flux path and the extent of an air gap between the translatable segment and the adjacent segment;

an annular non-magnetic seat member having a central opening aligned with, and disposed near the other end of, the fluid passage;

magnetic closure means comprising one of said segments and positioned adjacent the non-magnetic seat to define a fluid opening, said fluid opening being substantially less than said cross sectional area for operating positions of said closure means;

means defining a cylindrical guide adjacent said non-magnetic seat member to receive said magnetic closure means and to constrain the motion thereof substantially parallel to the longitudinal axis of said fluid passage between a position against said annular non-magnetic seat member and a position displaced therefrom;

means defining a fluid chamber communicating with said fluid passage through said fluid opening and enclosing said closure means;

fluid conduit means having a first end extending from said chamber whereby a differential fluid pressure can be applied between said other end of said fluid passage and the other end of said fluid conduit means; and

means for accessing the relative pressure in said chamber,

said closure means forming a part of said flux circuit such that fluid flow urged by a predetermined pressure difference through the fluid passage and seat member central opening and against the closure means can be modulated by varying the energization level of the electrical winding, translation of the adjustable segment along said flux path being effective to vary the portion of one of said segments in said flux path and the air gap distance and thus vary the reluctance of the flux circuit, to correspondingly adjust the response of the valve assembly for a given energization level of the electrical winding to provide a given pressure difference.

4,875,500

DIAPHRAGM TYPE OF PILOT OPERATED DIRECTIONAL CONTROL VALVE

Ryozo Ariizumi, Urawa; Masakuni Kainuma; Shoji Suda, both of Ohmiya; Toshikazu Aoki, Kawagoe; Takashi Ejiri; Masao Kojima, both of Tokyo, and Mitsunori Hoshi, Ohmiya, all of Japan, assignors to Fujikura Rubber Ltd., Tokyo, Japan

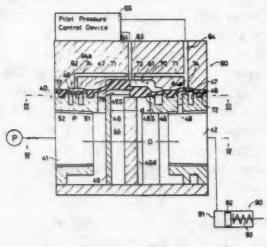
Division of Ser. No. 50,110, May 15, 1987, Pat. No. 4,744,388. This application Mar. 16, 1988, Ser. No. 169,236

Claims priority, application Japan, May 19, 1986, 61-114360; May 28, 1986, 61-80863; Sep. 30, 1986, 61-232933

The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.

Int. Cl.[4] F15B *13/042*

U.S. Cl. 137—596.18 **2 Claims**



1. A diaphragm type of pilot pressure operated directional control valve, comprising a pair of opposed passage block and control block, and a diaphragm held between the passage block and the control block, said passage block having a plurality of passages opening into the end face of the passage block located adjacent to the control block and defining an annular valve seat, said control block having pilot pressure passages opposed to the valve seat and connected to a pilot pressure source to exert a pilot pressure on the face of the diaphragm located adjacent to the control block said diaphragm having a center valve portion and an annular valve portion around the center valve portion, said center valve portion and said annular valve portion being independently subjected to the pilot pressure to selectively control fluid connection between said plurality of passages.

4,875,501

ELECTROMAGNETIC PROPORTIONAL CONTROL VALVE APPARATUS

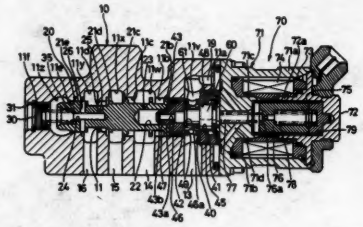
Kouji Ichihashi, and Jun-ichi Yasuma, both of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1989, Ser. No. 333,081

Claims priority, application Japan, Apr. 20, 1988, 63-52185[U]

Int. Cl.[4] F15B *13/043*

U.S. Cl. 137—625.64 **6 Claims**



1. An electromagnetic proportional control valve apparatus comprising:

(a) a valve body having a guide bore extending straight, and a supply port, a control port and a discharge port which communicate with said guide bore;

(b) a spool accommodated in said guide bore in said valve body for axial sliding movement in said guide bore, wherein said spool has a pair of land sections spaced axially from each other, wherein one of said pair of land sections controls communication between said supply port and said control port in accordance with a position of said spool, while the other land section controls communication between said control port and said discharge port, and wherein said spool has an axially extending axial bore formed in one end face of said spool, and first restricting bore means through which said axial bore communicates with said supply port;

(c) a valve seat element arranged in facing relation to said one end face of said spool to close said guide bore, said valve seat element being formed with a projecting portion at one end face of said valve seat element which is opposed to said spool, said projecting portion being inserted in said axial bore in said spool, wherein a restricting passage is defined between an outer peripheral surface of said projecting portion and an inner peripheral surface of said axial bore in said spool, wherein said valve seat element has an axially extending valve bore, and second restricting bore means formed in a forward part of said projecting portion, said valve bore having one end thereof communicating with said axial bore through said second restricting bore means, wherein the other end of said valve bore has a peripheral edge serving as a valve seat, wherein a fluid accumulating chamber is defined between said one end face of said spool and said one end face of said valve seat element, said fluid accumulating chamber being arranged about said projecting portion of said valve seat element, and wherein said fluid accumulating chamber communicates with said axial bore in said spool through said restricting passage defined between said projecting portion and said spool;

(d) a pilot valve arranged in facing relation to said valve seat; and

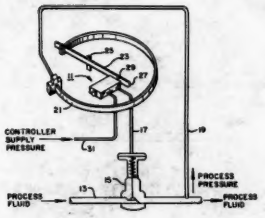
(e) electromagnetic drive means arranged at one end of said valve body for controlling said pilot valve.

4,875,502

FLAPPER ACTUATED PILOT VALVE

James Romano, Longview, Tex., assignor to Con-Tech Industries, Inc., Shreveport, La.

Filed Oct. 6, 1988, Ser. No. 255,343
Int. Cl.[4] G05D *16/00*; F16K *11/04*
U.S. Cl. 137—627.5 5 Claims



1. An improved flapper actuated pilot valve, comprising:

a valve body having an upper chamber, a lower chamber, and a gas passage which communicates said lower chamber, by means of a gas passage opening, with said upper chamber;

a gas inlet which communicates with said lower chamber for supplying control gas pressure to said valve and a gas outlet in said upper chamber for allowing the flow of control gas pressure from said valve;

a poppet having a stepped cylindrical shape including a lower end of a greater relative external diameter joined to a mid region of lesser relative external diameter than said lower end, said junction of said lower end and said mid region forming a primary sealing surface for contacting said gas passage opening into said lower chamber to seal off said lower chamber from said upper chamber, said mid region being joined to an upper end of lesser relative external diameter than said mid region, said junction of said mid region and said upper end forming a secondary sealing surface, said primary sealing surface presenting a greater sealing area than said secondary sealing surface, and wherein said upper end of said poppet extends into said upper chamber;

a flapper element having a lower sealing surface adapted to contact the secondary sealing surface of said poppet and having an upper portion which extends through an opening in said valve body for contacting said flapper, said flapper element having an interior bore which runs from said lower sealing surface thereof to an exhaust port for exhausting control gas pressure from said upper chamber, the secondary sealing surface of said poppet serving to block the escape of control gas pressure when said secondary sealing surface contacts said flapper element lower sealing surface;

wherein said flapper element is guided within said upper chamber by a pressure activated cupped seal; and

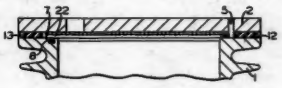
wherein said cupped seal has inner and outer circumferential wall portions which define a central opening for said flapper element, said cupped seal also having an in'egral gasket portion which extends outwardly in transverse fashion from said outer circumferential wall portion.

4,875,503

STOP FOR COMPRESSOR PLATE VALVE

Werner Heger, Lehrte; Manfred Kremer, Barsinghausen, and Heinrich Schlossarczyk, Wennigsen, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Apr. 29, 1988, Ser. No. 190,565
Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721464
Int. Cl.[4] F16K *15/14*
U.S. Cl. 137—856 17 Claims



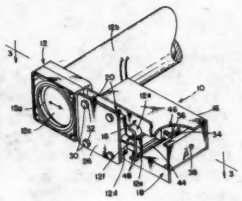
1. A stop apparatus for a plate valve of a fluid compressor equipped with a valve plate, one side of said valve plate being fastened and a free end of said valve plate being movable against a component of said fluid compressor, said stop apparatus comprising a pin engageable with and inserted into a cavity formed in said component in a stopping area, said pin being inserted into said cavity in such a way that at least one portion of a length of said pin serves as a stop for said valve plate, said pin being more resistant against wear than said component engageable with said pin.

4,875,504

RECREATIONAL VEHICLE GATE VALVE ACTUATOR

Walter P. Nicholson, 1543 Hayden View Dr., Coeur D'Alene, Id. 83814

Filed Dec. 8, 1988, Ser. No. 282,433
Int. Cl.[4] A01G *25/09*
U.S. Cl. 137—899 6 Claims



1. A retrofit electromechanical valve actuator for the remote operation of a manually operable tank drain valve installed on a recreational vehicle, the drain valve having a linearly sliding gate with an open and a closed position at the extremes of its travel and a manually operable valve handle attached thereto which slides in a linear, bidirectional manner to move the sliding gate between its open and closed positions, the actuator comprising:

a housing;

attachment means for removably securing the housing to the drain valve;

a drive shaft rotatably supported by the housing and having a threaded drive shaft portion;

a reversible electric drive motor selectively powered to produce clockwise or counterclockwise rotational drive, and unpowered to place it in a stationary, disabled state, the motor being mechanically engaged with the drive shaft to impart rotational drive thereto and supported by the housing;

an actuator fork having a threaded base threadably received on the threaded drive shaft portion and bidirectionally and

linearly movable along the drive shaft in response to rotation thereof, and a plurality of prongs attached to the base and configured to receive the valve handle therebetween and communicate the bidirectional linear motion of the traveling base to the valve handle in response to rotation of the drive shaft, the prongs being selectively detachable from the valve handle;

limit switch means for detecting movement of the threaded base to one of a pair of maximum desired excursion positions of a desired range of travel, the maximum excursion positions corresponding to the open and closed positions of the drain valve, and further for disabling the drive motor upon the threaded base's reaching one of the maximum excursion positions to prevent movement of the actuator fork beyond the desired range; and

a control switch positionable remote from the drain valve for connecting and disconnecting electrical energy to the drive motor with the desired polarity to selectively cause the drive motor to produce clockwise or counterclockwise rotational drive.

4,875,505

THREAD CLAMP

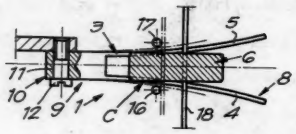
Denis Moeneclaey, Westrozebeke-Staden; Lucien Coopman, Zonnebeke, and Johnny Victoor, Langemark, all of Belgium, assignors to Picanol N.V., Belgium

Filed Mar. 18, 1988, Ser. No. 170,011

Claims priority, application Belgium, Apr. 2, 1987, 8700341

Int. Cl.[4] D03D *47/27*

U.S. Cl. 139—448 **12 Claims**



12. A thread clamp, comprising:

a first jaw having two spring arms that each have first and second ends, said first ends being fixed with respect to each other, and said second ends diverging from each other when said thread clamp is closed, wherein said spring arms bend elastically away from and towards each other perpendicularly to the plane in which the thread clamp opens and closes;

a second jaw that operates in conjunction with the first jaw;

an elastic device that serves to press the first and second jaws together; and

two stops for preventing a thread from moving in at least one direction, wherein said two stops are located on opposite sides of the jaws.

4,875,506

YARN BRAKE FOR A WEFT YARN

Lorant Gacsay, Zurich, and Beat Meierhofer, Jona, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 12, 1988, Ser. No. 193,346

Claims priority, application Switzerland, May 27, 1987, 02057/87

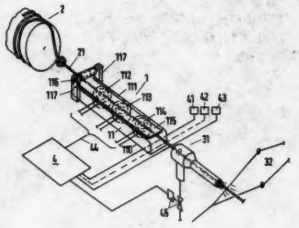
Int. Cl.[4] D03D *47/34*

U.S. Cl. 139—450 **24 Claims**

1. A yarn brake for a weft yarn comprising

an elongated rigid brake element;

a flexible strip-like brake element of at least partly ferromagnetic material disposed opposite said rigid brake element to receive a length of weft yarn longitudinally therebetween; and



a magnet means for selectively moving said flexible brake element towards said rigid brake element to brake a weft yarn therebetween.

4,875,507

PROCESS AND APPARATUS FOR GUIDING THE WEFT THREADS IN WEAVING LOOMS

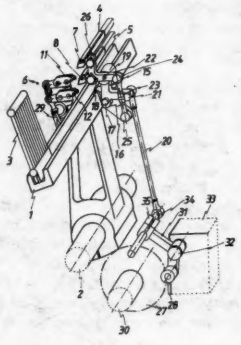
Johny Debaes, Wevelgem, Belgium, assignor to N.V. Michel Van De Wiele, Kortrijk-Marke, Belgium

Filed Dec. 7, 1987, Ser. No. 129,164

Claims priority, application Belgium, Dec. 30, 1986, 906,126

Int. Cl.[4] D03D *47/34*

U.S. Cl. 139—450 **11 Claims**



1. A process for guiding weft threads in a loom, characterized in that the weft threads are shifted relative to a moving lay of the loom over three consecutive positions, which coincide with various positions of the weft thread insertion during weaving,

further characterized in that weft guiding elements are located at a height of weft cutting devices of the loom and at a position where weft insertion means leave with new ends of the weft threads, wherein the guiding elements move by means of a drive of the weaving loom;

wherein the three consecutive positions are:

a carry position, in which the weft threads extend between clamping devices of cutters into eyes of guiding elements;

followed by an insertion position, in which the weft threads are drawn from the clamping devices and are inserted into sheds, while the weft guiding elements move downward toward the lay while the weft threads are being pulled through the sheds,

followed by a beat-up position in which the weft threads are held in a virtually straight line, virtually parallel to a reed and are moved into weft cutting devices at the moment that the reed is in its beat-up position; and

after completing this sequence of positions, the weft threads are shifted back to the carry position and the process start anew.

4,875,508

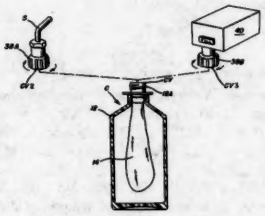
BEVERAGE CONTAINER SUITABLE FOR USE IN OUTER SPACE

Robert W. Burke, II, Stone Mountain; Albert J. Cahen, Jr., Roswell; William S. Credle, Jr., Stone Mountain; Ashis S. Gupta, Marietta, and Richard H. Heenan, Atlanta, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Division of Ser. No. 623,701, Jun. 22, 1985, abandoned. This application Sep. 25, 1985, Ser. No. 779,840

Int. Cl.[4] B65B *3/00*

U.S. Cl. 141—2 **6 Claims**



1. A method for filling a container with a carbonated beverage in the zero gravity conditions of outer space without the creation of a headspace and for dispensing said carbonated beverage therefrom directly into a consumer's mount, comprising the steps of:

(a) providing an expandable chamber in the container having means for normally biasing the expandable chamber to a minimal volume, said expandable chamber having an outlet opening with a normally closed valve therein;

(b) connecting the outlet opening in operative association with a beverage filling device;

(c) opening the valve to fill the expandable volume chamber from the minimal volume to a maximum volume against the force of the means for biasing;

(d) removing the beverage filling device from operative association with the outlet opening;

(e) connecting the outlet opening to a straw assembly; and

(f) opening the valve to permit the dispensing of the carbonated beverage through the straw assembly into the consumer's mouth;

whereby essentially no headspace is formed in the carbonated beverage during either the filling of the container or the dispensing of the beverage therefrom.

4,875,509

AIR PUMP PRESSURE CONTROL SYSTEM FOR INFLATING PAIRS OF AUTOMOTIVE TIRES

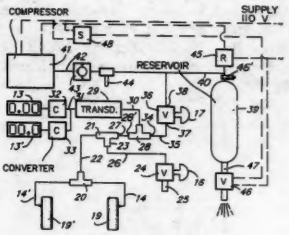
Jean Da Silva, Le Gardeur, Canada, assignor to E.R.C.D. Industries Inc., Montreal, Canada

Filed Feb. 16, 1988, Ser. No. 156,444

Int. Cl.[4] B60C *23/10*

U.S. Cl. 141—38 **3 Claims**

1. An air pressure control system for verifying and adjusting air pressure simultaneously in a pair of vehicle tires, said system comprising a pair of air conduits having valve connectors at a free end thereof for connecting said conduits to a respective one of a pair of vehicle tires, said conduits being interconnected together at a junction to equilibrate air pressure in said pair of tires, an air pressure reservoir having air under pressure stored therein, a compressor feeding said reservoir, said compressor being operated by a pressure switch connected to said reservoir when air pressure in said reservoir drops below a predetermined level, a purge valve connected to said reservoir to evacuate water condensate within said reservoir, said purge valve being operated momentarily by switch means connected to said compressor actuated each time said compressor is operated, valve means connecting said air pressure reservoir to said junction in an inflating mode to inflate said tires and to evacuate air from said tires in a deflating mode, said valve means being comprised of a first normally closed valve interconnected between said junction and said pressure reservoir to direct air pressure to said junction and both said tires of said pair of tires, and a second normally closed valve interconnected between said junction and outside atmosphere to evacuate air from said junction and said pair of tires, and pressure sensing means in the form of a transducer and connected to a conduit between said first and second valves, connected in association with said valve means and said junction to convert pressure sensed at said junction into an electrical signal to be representative of the air pressure equilibrated between said pair of tires, display means connected to said transducer to visually indicate said equilibrated pressure at said junction to determine if said valve means should be actuated and in which mode it should be placed at.



4,875,510

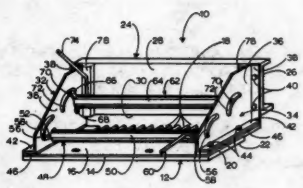
DOVETAIL MACHINE

John H. Muellers, 1540 Hastings Crescent, SE., Calgary, Alberta, Canada T2G 4E1

Filed Feb. 21, 1989, Ser. No. 312,176

Int. Cl.[4] B27M *3/00*

U.S. Cl. 144—145 A **17 Claims**



1. A dovetailing jig for use with a fixed dovetailing bit projecting from a bench surface, said jig comprising:

a base having a flat bottom surface for supporting the jig on the bench surface, a flat top surface for supporting a first work piece and a plurality of notches spaced along a back edge of the base for guiding the jig onto the bit as the jig slides on the bench surface;

a back having a flat front surface and a bottom edge;

means securing the back to the base with the flat front surface of the back perpendicular to the top surface of the base for supporting a second work piece, and with the bottom edge spaced above the top surface of the base;

a base clamp comprising a first elongated member positioned above and parallel to the top surface of the base and means mounting the first elongated member for selective move-

ment towards and away from the top surface thereby selectively to hold the first work piece on the top surface; a back clamp comprising a second elongated member positioned in front of and parallel to the front surface and means mounting the second elongated member for selective movement towards and away from the front surface thereby selectively holding the second work piece on the front surface.

4,875,511

APPARATUS FOR REMOVING BARK FROM LOGS

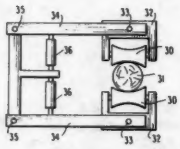
Robin Wingate-Hill, Curtin, and Bernard M. Hadaway, Highett, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organisation, Australia

Filed Dec. 10, 1987, Ser. No. 131,485

Claims priority, application Australia, Dec. 10, 1986, PH9431; Oct. 20, 1987, PI4967

Int. Cl.[4] B27L *1/00*; B27M *1/02*

U.S. Cl. 144—208 R **7 Claims**



1. Apparatus for removing bark from a log comprising:

(a) at least two pairs of rollers, each roller having a concave outer surface support means for mounting the rollers of each pair of rollers for rotation about respective axes of rotation disposed parallel to each other and spaced apart laterally at an angle relative to the axes of rotation of each other pair of rollers; each pair of rollers defining an aperture through which a log may pass, each said aperture being located on a linear path for said log through the apparatus;

(b) respective biasing means operatively connected to each pair of rollers for resiliently biasing at least one roller of each pair of rollers towards the other roller in its pair of rollers to apply pressure to the bark of the log; and

(c) cutting means for cutting through the bark during the passage of the log between the pairs of rollers.

4,875,512

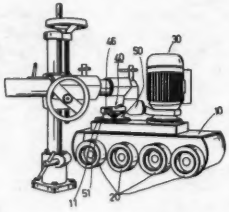
FEEDER HAVING A SPEED CHANGE MECHANISM WITH A GRADUATED THREADED-SHAFT PROTECTOR

Chin-Chi Lin, No. 88, Lane 539, San Fong Rd., Fong Yuan, Taiwan

Filed Feb. 9, 1989, Ser. No. 309,595

Int. Cl.[4] B27B *25/00*; B27C *1/12*

U.S. Cl. 144—246 E **1 Claim**



1. A feeder used on traditional wood-working machines, said feeder comprising a roller seat in which a plurality of conveying rollers are mounted, a motor mounted on said roller seat for driving said conveying rollers to rotate at a certain speed, and a speed change device mounted in said roller seat, said speed change device comprising a threaded control shaft which has one end thereof protruding out from said roller seat, and an adjusting knob having a bottom side connected with said end of said threaded control shaft for changing the rotating speed of said conveying rollers by manually rotating said adjusting knob, wherein the improvement is characterized in that said protruding end of said threaded control shaft is surrounded by a sleeve member fixed on said roller seat at one end thereof and protruding into an annular groove extended along said bottom side of said adjusting knob so as to protect said protruding end of said threaded control shaft from the accumulation foreign matter, said sleeve member having predetermined graduation marks scaled on an outer surface thereof to show the rotating speed of said conveying rollers when said adjusting knob is rotated downwards and upwards.

4,875,513

PORTABLE WORK BENCH

Stephen R. Skarsten, Welwyn, Great Britain, assignor to Skilten Tools Limited, Hertfordshire, United Kingdom

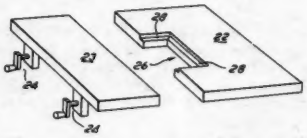
PCT No. PCT/GB87/00501, § 371 Date Apr. 8, 1988, § 102(e) Date Apr. 8, 1988, PCT Pub. No. WO88/00514, PCT Pub. Date Jan. 28, 1988

PCT Filed Jul. 15, 1987, Ser. No. 183,154

Claims priority, application United Kingdom, Jul. 15, 1987, 8617216

Int. Cl.[4] B27C *9/00*

U.S. Cl. 144—286 R **7 Claims**



1. A work bench top assembly comprising a bench top adapted for mounting on a supporting structure and having an aperture therein; a removable cover plate receivable in the aperture to define with the bench top a substantially continuous working surface and an insert plate receivable in the aperture in substitution for the cover plate, the insert plate having a tool opening; and mounting means for mounting a power tool beneath the insert plate in such a manner that the powered tool element of the power tool extends through the tool opening for operations upon a work piece supported on the bench top, wherein the bench top is formed of two separable parts abutting at a join line, said aperture being positioned as to open to said join line.

4,875,514

WOOD SPLITTING METHOD AND APPARATUS

Graham Hollister, Jr., P.O. Box 218, Genoa, Nev. 89411

Filed Oct. 24, 1988, Ser. No. 261,637

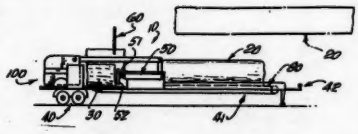
Int. Cl.[4] B27L *7/00*; B27M *1/08*

U.S. Cl. 144—367 **5 Claims**

1. The method of cutting firewood from a large log comprising: (1) moving a log along the bed of a trailer toward a log; (2) Cutting a predetermined length of the log; (3) moving the predetermined length of the log into a position between a multiple splitting device and a first hydraulic ram; (4) activating said hydraulic ram so as to push said cut portion of log through the multiple cutting device thus splitting the log into a multiplicity of relatively evenly shaped rectangular pieces of

wood; () withdrawing the ram to be in position to receive a second cut portion of log; and (6) advancing a second hydraulic ram through the first hydraulic ram so as to force the last portion of the log through the cutting device before the second log portion is cut.

4. An apparatus for cutting firewood from large logs comprising a multiplicity of cutting blades defining a multiplicity of rectangular shaped cutting edges; means to support said multiplicity of rectangular cutting edges on a frame; means associated with said frame to push a log section of wood against said cutting edges, which cutting edges are wedged shaped and



staggered with relation to each other so as to aid in expelling the wood being forced past them in that the staggering of the blades and the wedge shape causes an exfoliation effect with the wood being forced past the cutting edges as uniformly shaped rectangular pieces and wherein the means to push the log section against the cutting edges comprising an hydraulic ram consisting of a cylinder, a first cylinder rod which is hollow and in turn takes the hydraulic pressure when the hollow rod has reached its full extension and a second cylinder rod within the first cylinder rod which advances forward against a smaller portion of the center of said log section.

4,875,515

SLEEVE-MOUNTED SPIKE FITTED ON A VEHICLE TIRE

Erkki Suvanto, Porvoo, Finland, assignor to Neste Oy, Finland

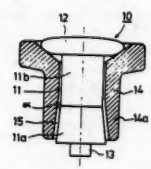
PCT No. PCT/FI88/00017, § 371 Date Oct. 25, 1988, § 102(e) Date Oct. 25, 1988, PCT Pub. No. WO88/06538, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 8, 1988, Ser. No. 267,129

Claims priority, application Finland, Feb. 27, 1987, 870881

Int. Cl.[4] B60C *11/16*

U.S. Cl. 152—210 **12 Claims**



1. A sleeve-mounted spike (10;20;30;40;50) fitted on a vehicle tire comprising a rivet (11;21;31;41;51), a head, (12;22;32;42;52), a tip (13;23;33;43;53) and a sleeve (14;24;34;44;54), characterized in that the part (11*a*;21*a*; 31*a*;41*a*;51*a*) of the rivet towards the tip and the part (11*b*;21*b*;31*b*;41*b*;51*b*) of the rivet towards the head subtend an angle (α)having a magnitude in the range from 150 to 179 degrees, whereby between the rivet (11;21;31;41;51) and the sleeve (14;24;34;44;54) no rectilinear contact is established, with the result that when the rivet (11;21;31;41;51) is urged against the sleeve (14;24;34;44;54) in vehicle acceleration, braking or sideslipping situations a greater force is required to push the rivet (11;21;31;41;51) into the tire, however without arresting the movement of the rivet (11;21;31;41;51) within the sleeve (14;24;34;44;54). .

4,875,516

VENETIAN BLIND CONTROL

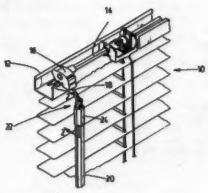
Norbert Marocco, 46 Pennygrass Ct., Woodbridge, Ontario, Canada

Filed Jul. 28, 1988, Ser. No. 225,148

Claims priority, application Canada, Feb. 29, 1988, 560140

Int. Cl.[4] E06B *9/38*

U.S. Cl. 160—178.1 **17 Claims**



1. A clutch assembly for use in association with a venetian blind of the type having a blind control and a control rod for operating said control and swingable joint means interconnecting said control rod and said blind control, said clutch assembly comprising:

a drive member adapted to be connected to said control rod;

a driven member adapted to be connected to said swingable joint means;

first engagement means on said drive member;

second engagement means on said driven member, said first and second engagement means being adapted to cooperate to transmit rotation of said control rod to said swingable joint means, and,

releaseable means in one of said first and second engagement means responsive to over-rotation of said control rod to discontinue transmission of said rotation to said swingable joint means.

4,875,517

METHOD OF PRODUCING SALT CORES FOR USE IN DIE CASTING

Raymond J. Donahue, Fond du Lac; Terrance M. Cleary, Allenton; Frederick M. Hanenstein, Oshkosh, and Daniel H. Marcellis, Appleton, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed May 1, 1989, Ser. No. 346,164

Int. Cl.[4] B22C *9/10*; B22D *29/00*

U.S. Cl. 164—34 **12 Claims**

1. A method of producing a salt core for high pressure die casting, comprising the steps of preparing a pattern of an evaporable foam material having a configuration identically proportional to the salt core to be produced, positioning the pattern in a mold and surrounding the pattern with an unbonded flowable inert finely divided material, contacting the pattern with a molten salt to vaporize the pattern with the vapor being trapped within the interstices of the flowable material and said molten salt filling the void created by vaporization of the pattern to produce a salt core having a configuration identically proportional to said pattern, and removing the salt core from the mold.

6. A method of producing a cast metal part, comprising the steps of preparing a pattern of an evaporable foam pattern havinga configuration identically proportional to a salt core to be produce,d positioning the pattern in a mold and surrounding the pattern with a flowable unbonded inert finelydivided material, contacting the pattern with molten salt to vaporize the pattern, with the vapor being trapped in the interstices of the flowable material and the salt filling the void created by vaporization ofthe pattern to provide a solidified salt core having a configuration identically proportional to said pattern, positioning the salt core in a metal die with the core spaced from the

die to provide a die cavity, introducing a molten metal having a melting point less than the melting point of said salt core into the die cavity to provide a cast metal part, and dissolving the salt core from the cast metal part.

4,875,518

METHOD OF AND APPARATUS FOR LOW-PRESSURE CASTING OF LIGHT METAL ALLOY

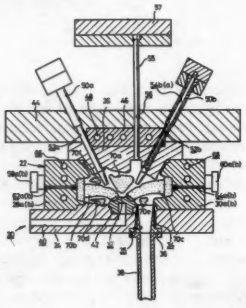
Takeshi Imura; Katsuhiko Ando; Shigemitsu Nakabayashi, and Maki Hirose, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 17, 1988, Ser. No. 233,144

Claims priority, application Japan, Aug. 21, 1987, 62-207777; Aug. 21, 1987, 62-207779

Int. Cl.[4] B22D *18/04*

U.S. Cl. 164—119 **20 Claims**



1. A method of low-pressure casting of a light metal alloy, comprising the steps of:

applying a fluid pressure on the surface of a light metal alloy stored in a closed container to introduce the light metal alloy from the closed container through a transfer tube and a sprue into a mold cavity defined in a mold assembly;

bringing the introduced molten metal alloy into contact with molds of said mold assembly which comprise metallic material having different thermal conductivities, respectively; and

controlling a time in which the molten metal alloy is solidified with said molds to produce a casting.

4,875,519

METHOD OF MANUFACTURING HOLLOW BILLET AND APPARATUS THEREFOR

Yoh Ishii, Oyama; Masami Abe, Tochigi; Yuhzoh Harada, Oyama; Atsumi Takasugi, Oyama, and Kazumi Kato, Oyama, all of Japan, assignors to Furukawa Aluminum Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1988, Ser. No. 185,436

Claims priority, application Japan, Apr. 30, 1987, 62-107749

Int. Cl.[4] B22D *11/04*

U.S. Cl. 164—465 **6 Claims**

1. A apparatus for manufacturing a hollow billet, said apparatus comprising:

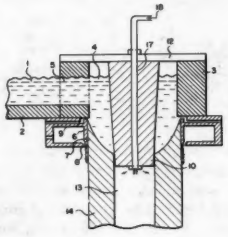
a vertical semi-continuous casting mold including an upper refractory heat-insulating portion, a lower cooling portion, a lubricant supply port formed between the cooling portion and the heat-insulating portion, and a molten metal storing portion surrounded by the heat-insulating portion;

a solid core disposed at a central portion of the molten metal storing portion; and

a through-hole formed in said solid core for supplying an inert gas to the interior of the hollow billet in the vicinity of said mold.

4. A method of manufacturing a hollow billet, comprising the steps of:

disposing a solid core at a central portion of a molten metal storing portion surrounded by an upper refractory heat-insulating portion of a vertical semi-continuous casting mold comprising the heat-insulating portion, a lower cooling portion, and a lubricant supply port formed between the heat-insulating portion and the cooling portion, a lower portion of the solid core or the entire solid core consisting of graphite, and the core being positioned such that a distal portion of the solid core is dipped in the



molten metal storing portion, so that the distal portion of the solid core is projected from the solidifying portion cooled by the lower cooling portion;

horizontally supplying, from one direction, a molten metal to the molten metal storing portion;

filling a hollow portion of the solidified distal portion with an inert gas supplied through a through-hole formed in the solid core; and

casting the molten metal, with cooling being provided by the cooling portion, and an inner diameter of the solidified distal portion of the molten metal being controlled by the distal portion of the solid core.

4,875,520

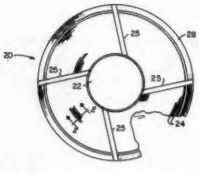
DESICCANT HEAT DEVICE

Donald F. Steele, Cohasset, Mass.; Lawrence C. Hoagland, Center Harbor, N.H.; Christopher Kyricos, Cohasset, and Peter Tolan, Scituate, both of Mass., assignors to Airxchange, Inc., Rockland, Mass.

Continuation of Ser. No. 790,198, Oct. 22, 1985, abandoned. This application Jul. 8, 1988, Ser. No. 219,834

Int. Cl.[4] F28D *19/00*; B01D *53/06*

U.S. Cl. 165—10 **17 Claims**



1. A desiccant regenerative heat exchange device comprising at least one plastic surface coated with finely comminuted particles of dry desiccant bound to said at least one plastic surface as a consequence of dissolving to a minor depth using a selected solvent at least the portion of said at least one plastic surface contacting said particles.

4,875,521

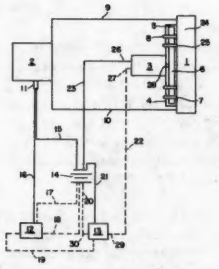
ELECTRIC FAN ASSEMBLY FOR OVER-THE-ROAD TRUCKS

Roger Clemente, 1789 Vauxhall Rd., Union, N.J. 07083

Filed Feb. 27, 1987, Ser. No. 19,693

Int. Cl.[4] F01P 7/02

U.S. Cl. 165—39 8 Claims



1. The combination of an over-the-road truck having an internal combustion engine of at least 200 hp and having a heat transfer assembly for cooling an intermediate heat transfer fluid for said internal combustion engine, said heat transfer assembly comprising exclusively an electric fan assembly to operate only when necessary to cool said heat transfer assembly and consisting of an electric motor including a shaft having an axial flow fan mounted thereon, and further comprising:

a support means for attaching said electric motor to said heat exchanger;

a battery for driving said electric motor; and

a switch means to control starting and stopping of said electric motor, said electric motor having a minimum wattage calculated by the empirical equation:

$$W=1.75E$$

wherein:

W=wattage of electric motor, and

E=Horsepower of said internal combustion engine

said heat transfer assembly having a core size determined by the empirical equation:

$$R=3E$$

wherein:

R=core size (in^2)

and said axial flow fan for said heat transfer assembly providing for air flow determined by the equation:

$$C=22.5E$$

wherein:

C=air flow (CFM).

4,875,522

HEAT PIPE HEAT EXCHANGER

Hajime Noda, Yokohama; Kuniyoshi Sato, Tokyo, and Junji Sotani, Yokohama, all of Japan, assignors to Furukawa Electric Co., Ltd., Tokyo, Japan

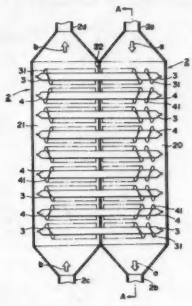
Filed Apr. 18, 1989, Ser. No. 340,059

Claims priority, application Japan, Apr. 20, 1988, 63-97561

Int. Cl.[4] F28D 15/02; F28G 13/00

U.S. Cl. 165—104.14 7 Claims

7. A heat pipe heat exchanger of claim 2 in which the tube of the heat pipes exposed to a relatively hotter gas flow in the hot gas flow duct are of carbon steel, while those exposed to a



relatively less hot gas flow in the hot gas flow duct are of stainless steel.

4,875,523

PIPELINE SERVICING TOOL

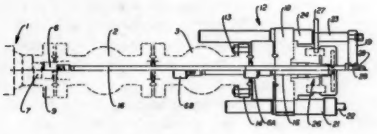
Edward T. Thornburrow, West Yorkshire, England, assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Oct. 12, 1988, Ser. No. 256,454

Claims priority, application United Kingdom, Dec. 24, 1987, 8730103

Int. Cl.[4] E21B 23/00, 33/068

U.S. Cl. 166—77 7 Claims



1. A pipeline servicing tool comprising:

a fixed crosshead which can be mounted axially aligned on the end of a pipeline such as a wellhead spool outlet and having a bore therethrough,

a rod positioned within said fixed crosshead bore and being axially slidable and rotatable therein,

gripping means in the fixed crosshead for holding the rod against axial movement,

a movable crosshead connected to the fixed crosshead with fluid pressure operable drive means for advancing and retracting the moving crosshead in the axial direction of the rod, and at least one or more rod extension piece,

the rod and the extension being securely connectable end-to-end in axial alignment for longitudinal and rotational movement within said fixed crosshead bore,

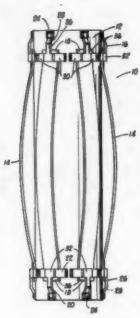
safety stop means on the fixed crosshead, movable into position closely behind the rear end of one of the rod, and the rod extension when connected to the rod, to block the rearward path of movement of the rod in event of failure of the gripping means to hold the rod or its extension.

4,875,524

CASING CENTRALIZER

Billie J. Bradley; Richard L. Giroux, and Allen T. Joyce, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Sep. 29, 1988, Ser. No. 250,900
Int. Cl.[4] E21B *17/10*
U.S. Cl. 166—241 7 Claims



1. A semi-rigid centralizer for use in a well installed on conduit members therein, said centralizer comprising:

a tubular housing having a longitudinal axis and a circumferential direction thereabout installed on a conduit member of said conduit members in said well;

a first plurality of spring retainers secured to the outer portion of a first end portion of the tubular housing, each spring retainer of the first plurality of spring retainers being formed as a T shaped member having a stem portion and a crossbar portion wherein a portion of the stem portion of the T shaped member is secured to the tubular housing substantially in the direction of the longitudinal axis of the tubular housing and wherein portions of the crossbar portion of the T shaped member are secured substantially in a circumferential direction of the housing;

a second plurality of spring retainers secured to the outer portion of another end portion of the tubular housing, each spring retainer of the second plurality of spring retainers being formed as a T shaped member having a stem portion and a crossbar portion wherein a portion of the stem portion of the T shaped member is secured to the tubular housing substantially in the direction of the longitudinal axis of the tubular housing and wherein portions of the crossbar portion of the T shaped member are secured substantially in a circumferential direction of the tubular housing, and

a plurality of elongated centralizer spring members, each centralizer spring member of the plurality of elongated centralizer spring members having one end thereof secured by a spring retainer of the first plurality of spring retainers wherein a portion of the stem portion and the crossbar portion of each T shaped member overlying a portion of one end of each centralizer spring and another end thereof secured by a spring retainer of the second plurality of spring retainers wherein a portion of the stem portion and the crossbar portion of each T shaped member overlying a portion of the another end of each centralizer spring.

4,875,525

CONSOLIDATED PROPPANT PACK FOR PRODUCING FORMATIONS

Michael L. Mana, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 3, 1989, Ser. No. 318,867
Int. Cl.[4] E21B *43/02, 43/267*
U.S. Cl. 166—280 12 Claims

1. A method for forming a porous, consolidated proppant pack at or in a producing formation in an earthen well, said method comprising:

mixing both proppants which have been coated with an unset consolidating material and particles of a dissolvable material into a carrier liquid;

flowing said carrier fluid with said proppants and said particles entrained therein down said well to said formation;

allowing said proppants and said particles to remain at rest until said consolidating material on said proppants sets and consolidates to form said porous consolidated proppant pack; and

dissolving said particles of said dissolvable material after said proppant pack has been consolidated to thereby increase the porosity and hence, the permeability of said pack.

12. A porous, consolidated proppant pack in an earthen well, said pack being formed by:

mixing both proppants which have been coated with an unset consolidating material and particles of a dissolvable material into a carrier liquid;

flowing said carrier fluid with said proppants and said particles entrained therein down said well;

allowing said proppants and said particles to remain at rest until said consolidating material on said proppants sets and consolidates to form said porous consolidated proppant pack; and

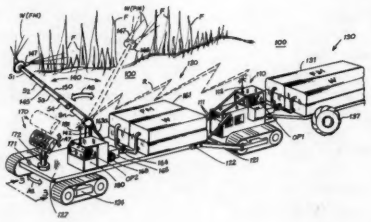
dissolving said particles of said dissolvable material after said proppant pack has been consolidated to thereby increase the porosity and hence, the permeability of said pack.

4,875,526

ROUGH TERRAIN, LARGE WATER VOLUME, TRACK DRIVEN FIREFIGHTING APPARATUS AND METHOD

Vincent P. Latino, and Sandra L. Latino, both of 6001 S. Park Ave., Space #11, Tucson, Ariz. 85706

Filed Dec. 9, 1988, Ser. No. 283,151
Int. Cl.[4] A62C *27/06, 27/08, 27/30*
U.S. Cl. 169—24 19 Claims



10. A firefighting apparatus for use in fighting fires in remote, rough terrain, said firefighting apparatus comprising:

(a) a motorized tracked vehicle;

(b) a front platform means, said front platform means being pushed by said motorized tracked vehicle and being adapted with a cab member for housing controls and protecting an operator from fire dangers, steerable track means for guiding said platform means by said operator, tank means for storing a large volume of fire extinguishing substance, hose system means connected to said tank means, multi-directionally adjustable fire extinguishing substance delivery means connected to said hose system

for delivering said fire extinguishing substance to a fire being fought; and

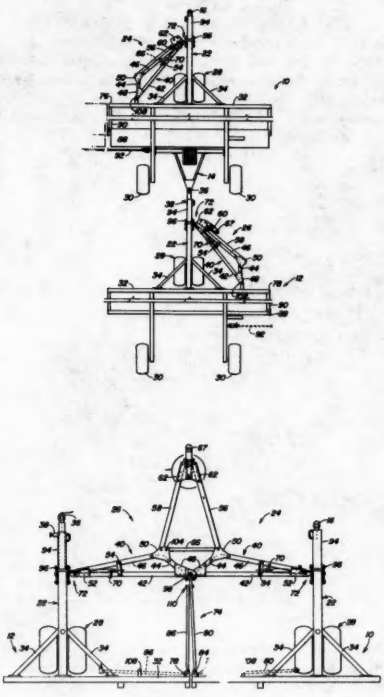
(c) a rear platform means adapted with a plurality of wheel members for use on terrain having hot ash materials, hitch means for being drawn by said motorized tracked vehicle, reserve tank means for storing reserve volume of said fire extinguishing substance and a fire extinguishing substance transfer system for delivering said fire extinguishing substance forwardly to said hose system means.

4,875,527

DUAL IMPLEMENT HITCH ASSEMBLY

Daniel M. Foley, Pleasant Hill; Michael D. Snyder, and John D. Long, both of Ankeny, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Sep. 8, 1988, Ser. No. 241,668
Int. Cl.[4] A01B 63/00
U.S. Cl. 172—248 8 Claims



1. A dual implement hitch assembly for coupling first and second rigid horizontal frames for side-by-side field operation, each frame having a fore-and-aft extending rigid drawbar, the hitch assembly comprising:

first hitch structure carried to the left side of the first drawbar and a second hitch structure carried to the right side of the second drawbar, each hitch structure including

a triangularly-shaped member having first, second and third corners, the first corner being pivotally connected to the drawbar;

an elongated member pivotally connected at one of its ends to the second corner;

means connectable to a traction vehicle carried by one of the elongated members at its end opposite its connection with the triangularly-shaped member;

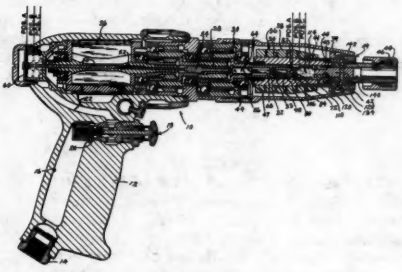
and means for connecting the two hitch structures together including coupling means for connecting the second corners of the triangularly-shaped members together and for joining the third corners of the triangularly-shaped members together, said connecting means also adapted to join the elongated members together at their ends opposite their respective connections to a second corner.

4,875,528

TORQUE CONTROL ACTUATOR

Clyde D. Thackston, Columbia, S.C., assignor to Allen-Bradley Company, Inc., Columbia, S.C.

Filed Feb. 13, 1989, Ser. No. 310,277
Int. Cl.[4] B25B 23/14
U.S. Cl. 173—12 8 Claims



1. A torque control actuator, comprising:

a clutch including:

(a) an input shaft adapted to be rotatively driven by a prime mover;

(b) an output shaft adapted to rotatively drive a workpiece; and

(c) means connecting the input shaft to the output shaft to rotationally drive the output shaft in response to rotation of the input shaft below a first predetermined torque, said means allowing the output shaft to slip relative to the input shaft above the predetermined torque;

first rotary engagement means coupled to the output shaft to rotate with the output shaft;

second rotary engagement means axially slidable relative to the first rotary engagement means into and out of engagement with said first means, said second means having a cam surface defined thereon, said cam surface having a ledge facing axially away from the first means, a leg portion extending from an end of the ledge toward the first means and an inclined return portion axially opposed from the leg and ledge and extending axially away from the leg and ledge from an angular position of the leg to the angular position of an ledge;

cam means rotatively driven at the speed of said input shaft, said cam means being connected to the second rotary engagement means so as to cam on the cam surface of the second rotary engagement means;

an axially moveable control for effecting a desired operation;

means for translating axial movements of the cam means to the control;

means biasing the cam means, the second rotational engagement means, the translating means and the control to an initial position in which the second rotary engagement means is out of engagement with the first rotary engagement means; and

releasable means for axially moving the control, the translating means, the cam means and the second rotary engage-

ment means against the force of the biasing means in response to operation of the prime mover;

wherein:

(a) upon initial operation of the prime mover below the first predetermined torque exerted on the workpiece, the moving means urges the control, the translation means, the cam means and the second rotary engagement means from an initial axial position to a second axial position, said axial movement causing said cam means to abut the ledge of the cam surface and thereby engage the first and second rotary engagement means so that both said engagement means rotate with the output shaft;

(b) at operating torques at least as great as the first predetermined torque the output shaft slips relative to the input shaft and the cam means cams off the ledge into the leg to move axially relative to the second rotary engagement means to a third axial position, said axial movement allowing the control to move to a corresponding third axial position; and

(c) release of the moving means allows the biasing means to return the cam means, second rotary engagement means, translation means and control to the initial position, whereupon the cam means cams on the return portion of the cam surface to angularly align the cam means with the ledge of the cam surface in the initial position.

4,875,529

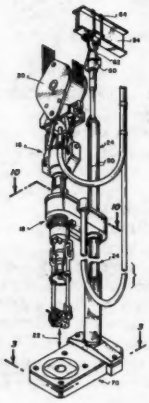
ALTERNATE FORMS OF, SIDE DRIVE DRILLING

Stephen B. Wetch, Ventura; Gregory A. Goris, Oxnard, and Igor Krasnov, Port Hueneme, all of Calif., assignors to Varco International, Inc., Orange, Calif.

Continuation of Ser. No. 820,776, Jan. 21, 1986, abandoned. This application Dec. 11, 1987, Ser. No. 133,174

Int. Cl.[4] E21B *3/00*

U.S. Cl. 173—163 **15 Claims**



1. In a rail-less system for drilling oil and gas wells, having drilling means, a platform with an opening through which drilling operations may be conducted, and a derrick on said platform centered over said opening, the improvement comprising;

drive means located at the platform,

an elongated rod means whose top end is tethered on said derrick and whose bottom end is connected to be rotated by said drive means but is otherwise unconnected to said derrick,

said elongated rod being parallel to the center of said opening and center line of said derrick,

driven means responsive to the torque applied to said elongated rod by said drive means and movable vertically on said elongated rod means to apply torque to said drill means whereby drilling operations may be carried out through said opening,

said driven means including first rotatable means connected to said elongated rod means but otherwise unconnected to said derrick and a second rotatable means connected to said first rotatable means with the drive ratio of substantially 1:1 to avoid excessive deflections of said drilling means and eliminate the need for rails on said derrick and such that the diameters of said first rotatable means and said second rotatable means are equal and the direction of rotation is the same between the two rotatable means, and

wherein said drive means located at the platform includes;

a first drive means and a rotary table, said first drive means being connected to and rotatable by said rotary table, and

a second driven means connected to and rotatable by said first drive means and connected to said elongated rod means.

4,875,530

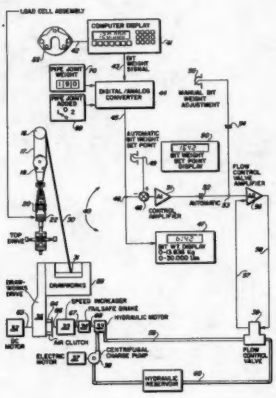
AUTOMATIC DRILLING SYSTEM

Tommy S. Frink, Tulsa; Lowell M. Reed, Oklahoma City, both of Okla.; Dwayne V. Cochran, Midland, and Will L. McNair, Sugerland, both of Tex., assignors to Parker Technology, Inc., Odessa, Tex.

Continuation of Ser. No. 100,567, Sep. 24, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 328,774

Int. Cl.[4] E21B *44/00*; B66D *5/20, 5/26*

U.S. Cl. 175—27 **22 Claims**



1. In a drilling operation wherein a drilling rig supports a drill string by a cable spooled onto a drawworks drum, a drawworks motor connected to rotate said drum for spooling and unspooling the cable and thereby lifting and lowering a drill string, a drawworks brake for braking the drum, and means for rotating a drill string which has a drill bit at the bottom thereof for penetrating a formation while fluid flows through a swivel located at the upper end of the drill string and through the string downhole to the bit; the method of controlling the weight on bit comprising the following steps:

(1) weighing the drill string while the drill string is suspended within the borehole with the bit off bottom and generating a signal which is proportional to the drill string weight;

(2) selecting an optimum value for the weight on bit as the bit is rotated while making hole;

(3) modifying the signal of step (1) by combining said selected value of step (2) therewith to thereby provide a

signal representative of the drill string weight required to achieve the weight on bit of step (2);

(4) treating the resultant signal obtained in step (3) to provide a control signal which is proportional to the drill string weight required to achieve the weight on bit of step (2);

(5) continuously supporting the drill string during a drilling operation by applying a variable rotational force on said drawworks drum by connecting a motor means to be rotated by the drawworks drum as the drum unspools cable therefrom; and, applying power to said motor means to drive said motor means in opposition to the unspooling of the drawworks drum; and,

(6) controlling the torque that said motor means applies to resist rotation of said drum by applying power to said motor means in proportion to said control signal of step (4) to thereby cause the motor means to apply a rotational force to the drum that continually approaches a constant weight on bit which is equal to the selected value of step (2).

14. A drilling rig having a top drive unit comprised of an electric motor connected to rotate the upper end of a drill string; a bit at the lower end of the string; a swivel supports the motor; drilling fluid flows through said swivel, and continues through a rotating hollow shaft of said motor; said swivel is supported from a traveling block which in turn is supported by a plurality of cable strands from a crown block, one end of the cable being rove about a drawworks drum so that rotation of the drum changes the elevation of the string; whereby as the tension in the cable is reduced the string is lowered and the bit engages and penetrates a formation;

first motor means for rotating said drum to thereby lift and lower said traveling block whereupon said swivel, electric motor, drill string and bit are lifted uphole and lowered downhole;

a second motor means connected to be rotated by unspooling of said drawworks drum; said second motor means applies a rotational force to said drawworks drum that is opposed to unspooling of said drawworks drum; said second motor means resists unspooling of the drawworks drum in proportion to the power delivered to said second motor means;

means weighing said drill string while the bit is off bottom and converting the weight measurement into a signal proportional thereto; means selecting a weight on bit, and converting the weight on bit selection into a signal proportional thereto; the weight on bit being a fraction of the drill string weight;

means combining the drill string weight signal and the selected weight on bit signal to provide an operating signal representative of the tension that must be effected in the cable in order to achieve said weight on bit;

and means controlling the power delivered to said second motor means in proportion to the magnitude of said operating signal to continually adjust the rotational force of the second motor means and thereby adjust the weight on bit to a value substantially equal to said selected value of the weight on bit.

4,875,531

CORE DRILLING TOOL WITH DIRECT DRIVE

Johann Biehl, Kirchheim/Teck, and Alfred Ostertag, Celle, both of Fed. Rep. of Germany, assignors to Eastman Christensen Company, Salt Lake City, Utah

Filed Jan. 25, 1988, Ser. No. 148,676

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1987, 3701914

Int. Cl.[4] E21B *25/02*

U.S. Cl. 175—250 **8 Claims**

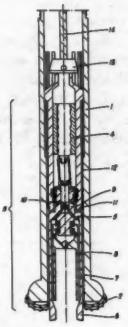
1. A direct drive core drilling tool comprising:

an outer pipe adapted at its upper end to be connected to a drilling shaft;

a core drilling appliance reciprocally mountable within said outer pipe, said core drilling appliance comprising:

(a) a core barrel adapted at its lower end to carry a drill bit, and

(b) an inner pipe mounted within said core barrel for reciprocal movement therewith and in rotatable relation therewith, and adapted at its lower end to receive a core entering the core barrel; and



a mud motor positionable within the outer pipe in an axially moveable relation, said mud motor coupled to the upper end of the core barrel to rotate the core barrel, and operable in response to drilling fluid, or mud, passed down through the drill shaft and into the core drilling appliance;

said mud motor and said core drilling appliance each comprising reaction faces responsive to liquid pressure to produce a downward axial feed force acting on both the motor and the core drilling appliance.

4,875,532

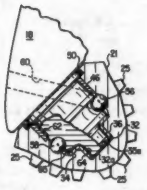
ROLLER DRILL BIT HAVING RADIAL-THRUST PILOT BUSHING INCORPORATING ANTI-GALLING MATERIAL

James W. Langford, Jr., Red Oak, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 19, 1988, Ser. No. 246,513

Int. Cl.[4] B21D *53/10;* **E21B** *10/22;* **F16C** *33/12, 33/24*

U.S. Cl. 175—371 **25 Claims**



9. In a rotary earth drilling bit, the combination comprising:

a body portion adapted to be connected to a rotary drill member and having a downwardly depending arm member;

a cylindrical cutter spindle extending from said arm member and having a stepped configuration providing an enlarged journal section which is stepped down to provide an annular shoulder and a reduced pilot pin projecting from said annular shoulder;

a roller cutter rotatably mounted on said spindle and having an enlarged rearward bearing recess receiving said journal section and a reduced forward bearing recess receiving said pilot pin and defining with said enlarged recess an

annular thrust face corresponding generally to said spindle annular shoulder;

a journal sleeve bushing in the enlarged bearing recess of said roller cutter and receiving said enlarged journal section of said spindle in a radial load bearing relationship, the inner surface of said journal bushing incorporating an anti-galling material; and

a pilot bushing secured in said roller cutter against rotational movement relative thereto and having a sleeve portion extending into said reduced forward recess and an integral annular rim portion extending outwardly from said sleeve portion over said thrust face, the outer surface of said rim portion contacting said spindle shoulder in a thrust load bearing relationship and the inner surface of said sleeve portion receiving said pilot pin in a radial load bearing relationship, said inner sleeve surface and said outer rim surface incorporating an anti-galling material.

4,875,533

AUTOMATIC WEIGHT DETECTING DEVICE

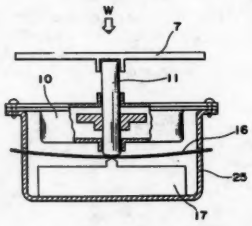
Makoto Mihara, Nara; Masanobu Inoue, Yamatokoriyama; Kenzo Ohji, Ikoma, and Shuji Itou, Shiki, all of Japan, assignors to Matsushita Electric Industral Co., Ltd., Osaka, Japan

Filed Jul. 8, 1988, Ser. No. 216,497

Claims priority, application Japan, Jul. 13, 1987, 62-174097; Jul. 13, 1987, 62-174098

Int. Cl.[4] G01G *19/52, 3/14*

U.S. Cl. 177—144 **12 Claims**



1. A weight detecting device, comprising:

a plate for receiving an object to be measured;

a rotatable shaft supporting said plate and movable a predetermined amount along a thrust axis of said rotatable shaft;

a leaf spring receiving and supporting a lower end of said rotatable shaft, said leaf spring movable in the direction of said thrust axis of said rotatable shaft at the point on said leaf spring supporting said lower end of said rotatable shaft, said leaf spring having opposite ends;

a support means for horizontally supporting said opposite ends of said leaf spring;

a load detecting means disposed below said leaf spring for detecting a composite load of said object on said plate, via said rotatable shaft and said leaft spring, and the stress on said leaf spring, and for outputting an electrical signal corresponding to said composite load; and

a weight detecting circuit for detecting the weight of said object from said electrical signal of said load detecting means.

4,875,534

WEIGHING APPARATUS WITH IMPROVED ELECTROMAGNETIC LOAD COMPENSATION

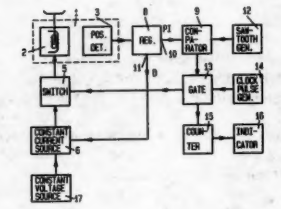
Peter Kunz, Gossau, Switzerland, assignor to Mettler Instruments AG, Greifensee, Switzerland

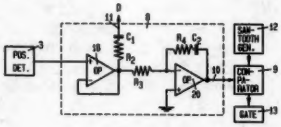
Filed May 19, 1989, Ser. No. 354,017

Claims priority, application Switzerland, Jun. 14, 1988, 2273/88

Int. Cl.[4] G01G *7/00*

U.S. Cl. 177—212 **5 Claims**





1. Weighing apparatus of the electromagnetic load compensation type, comprising:

(a) load receiving means connected for movement relative to a fixed support;

(b) electromagnetic means (2) including means establishing a stationary magnetic field relative to said fixed support, and a coil arranged in said field and connected with said load receiving means;

(c) means operable in response to the application of a load to be measured to said load receiving means for supplying compensation current to said coil to virtually maintain said load receiving means in an initial position relative to said support, said current supplying means including:

(1) position detector means (3) for generating a position signal responsive to the position of said load receiving means relative to said support;

(2) regulating means (8) responsive to said position signal for generating a regulating signal including proportional (P), integral (I) and differential (D) components;

(3) means (6) supplying constant direct current;

(4) switch means (5) connecting said constant current supply means with said electromagnetic means; and

(5) means responsive to the proportional (P) and integral (I) components of said regulating signal for periodically operating said switch means between conducting and non-conducting conditions to supply current to said electromagnetic means;

(d) means (6) responsive to the differential component (D) of said regulating signal for controlling said constant current means to modulate the amplitude of the constant current; and

(e) indicator means (16) for indicating the magnitude of the applied load as a function of the compensation current supplied to said electromagnetic means.

4,875,535

VEHICLE DRIVE

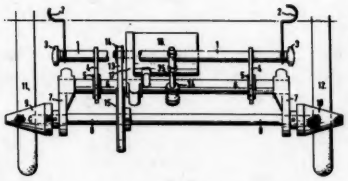
Robert H. Parker, Esher, England, assignor to Autokraft Limited, Weybridge, England

Filed Oct. 1, 1987, Ser. No. 103,138

Claims priority, application United Kingdom, Oct. 2, 1986, 8623710

Int. Cl.[4] B62D *11/02;* A61G *5/04*

U.S. Cl. 180—6.2 7 Claims



1. Apparatus for driving and steering a wheeled vehicle comprising an oppositely-directed pair of rotary friction-drive cones mounted to extend each respectively across the periphery of one of a pair of vehicle road wheels, means for transmitting drive to the cones in frictional driving contact each with the periphery of its respective road wheel, and steering means for simultaneously moving the cones in one axial direction or the other so as to control the cone diameter at which each respective cone contacts its road wheel and thus control the speed of either road wheel relative to the other.

4,875,536

CONTROL DEVICE FOR OPERATING A MOTOR VEHICLE

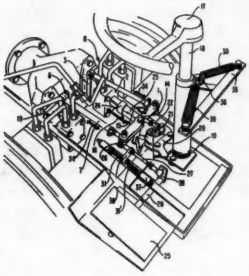
Niko K. Saur, Roigheim, and Wolfgang Bronner, Neudenau-Kressbach, both of Fed. Rep. of Germany, assignors to Agria-Werke GmbH, Möckmühl, Fed. Rep. of Germany

Filed Jul. 20, 1988, Ser. No. 221,997

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723965

Int. Cl.[4] B62D *6/00*

U.S. Cl. 180—6.32 12 Claims



1. A control device for operating a vehicle; comprising

running gears arranged at each side of the vehicle;

driving means cooperating with said running gears for allowing the latter to be driven separately of each other, said driving means including a control member for each of said running gears;

a pair of user-actuated members; and

connecting means for operatively linking said user-actuated members to said control members, said connecting means including an actuating element connected to said control members, said actuating element being rotatable about a rotational axis and movable in a direction perpendicular to said rotational axis, each of said user-actuated members being operatively connected to said actuating element so that an adjustment of one of said user-actuated members causes a translational motion of said actuating element and a displacement of said control members in a same direction as said actuating element, and an adjustment of said other user-actuated member causes a rotation of said actuating element and a displacement of said control members in a direction opposite to each other.

4,875,537

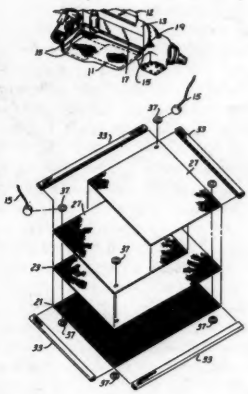
DISPOSABLE OIL ABSORBENT DRIP PAD ASSEMBLY FOR A VEHICLE

Anthony H. Garnatz, Mt. Clemens, and William M. Ronne, Sterling Heights, both of Mich., assignors to Garon Corp., Mt. Clemens, Mich.

Filed May 5, 1988, Ser. No. 190,390

Int. Cl.[4] B62D *25/20*

U.S. Cl. 180—69.1 15 Claims



1. A disposable oil-absorbent drip pad assembly adapted for suspension under the bottom of a vehicle to collect oil, grease and hydraulic fluids, comprising:

a bottom layer of a metallic screen material;

an intermediate layer of insulating material overlying and engaging the bottom layer;

a top layer of oil-absorbent material overlying and engaging the intermediate layer;

said layers each having outer peripheries;

means peripherally securing and interconnecting said layers throughout their peripheries;

apertured mount means extending through portions of the assembled layers adapted to receive fasteners for suspending the pad assembly from a vehicle;

each of said bottom, intermediate and top layers being generally planar and thus having two main axes, a first being defined as longitudinal and the second being defined as transverse; and

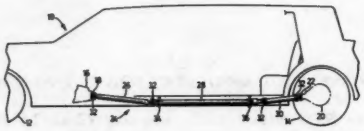
said top layer consisting of a pair of longitudinally overlapped top layer elements, said elements being overlapped over a portion of their longitudinal extents thus defining overlapped areas, and laterally spaced transverse stitching interconnecting a longitudinal end portion of each top layer element with a longitudinally intermediate portion of the other top layer element.

4,875,538

REDUCED SIZE TRANSMISSION TUNNEL IN AN AUTOMOBILE AND A METHOD FOR THE SAME

Gordon Hodgson, Thornhill; Douglas G. Broadhead, Scarborough, and David J. Parent, Mississauga, all of Canada, assignors to AHA Automotive Technologies Corporation, Brampton, Canada

Filed Mar. 15, 1988, Ser. No. 168,366
Int. Cl.[4] B60K 23/00
U.S. Cl. 180—379 18 Claims



1. A rear wheel driven passenger automobile having an under hung carriage, an engine located at a front end, a transmission unit, a rear passenger compartment having a floor and a rear passenger seat and the automobile including:

a segmented drive shaft having at least three elements for transmitting rotation from the transmission unit to the rear wheels and including;

a first element connected between an output shaft of the transmission unit and a second element, the first element being inclined downwardly from front to back;

a second element connected between the first element and third element and being generally parallel to and below the floor;

a third element connected between the second element and a pinion of a rear differential, the third element being located substantially below the rear passenger seat;

a substantially flat floor located in front of the rear passenger seat and including a transmission tunnel of reduced size the transmission tunnel having a flat upper surface sloping, side surfaces and flat lower surfaces;

means for supporting the segmented drive shaft in place below the floor, the supporting means comprising at least one hanger member fixed to the underside of the automobile, and having bearing means therein; and

reinforcing means for reinforcing the automobile between the front and rear wheels, the reinforcing means comprising two reinforced floor panels being secured on either side of said transmission tunnel to said flat lower surfaces.

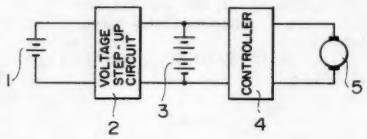
4,875,539

ELECTRIC POWER STEERING CONTROL SYSTEM

Toshimi Abukawa, Hitachiota; Kazuo Tahara, Hitachi; Katsuji Murumoto, Hitachi; Toshiyuki Koterazawa, Hitachi; Mitsuyuki Hombu, Katsuta; Tadashi Takahashi; Shuichi Takamatsu, both of Hitachi; Hisatugu Ishikura, Katsuta; Hiroshisa Yamamura, Hitachiota; Toru Tatsuzaki, Funabashi; Tsutomu Ohmae, Hitachi; Toshiaki Okuyama, Ibaraki; Seizi Yamashita, Katsuta; Shigeki Saito, Katsuta, and Masato Sakai, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuda, both of, Japan

Filed Mar. 31, 1988, Ser. No. 176,151
Claims priority, application Japan, Mar. 31, 1987, 62-78194; Aug. 12, 1987, 62-199748
Int. Cl.[4] B62D 5/04
U.S. Cl. 180—79.1 20 Claims

1. An electric power steering control system comprising an electric motor which provides an assisting force for a steering system of a vehicle through a reduction gear; a torque sensor which is fitted on a steering shaft for detecting the steering torque; a controller which controls the input to said motor in accordance with the output of said torque sensor; a battery which supplies power to said controller; and a voltage step-up



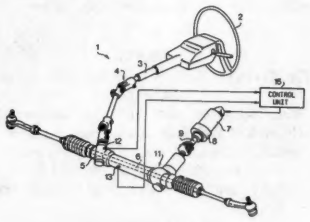
means which is connected to said battery for driving said motor at a voltage higher than the voltage of said battery.

4,875,540

ELECTRIC POWER STEERING SYSTEM

Saiichiro Oshita; Toyohiko Mouri, and Tsutomu Takahaski, all of Ohta, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 203,302
Claims priority, application Japan, Jun. 9, 1987, 62-143808
Int. Cl.[4] B62D 5/04, 6/02
U.S. Cl. 180—79.1 14 Claims



1. An electric power steering system for a motor vehicle, comprising

a motor operatively connected to a steering system for reducing steering effort,

a vehicle speed sensor for producing a vehicle speed signal,

a torsion torque sensor provided for detecting torsion torque which is generated in the steering system during a steering operation,

assist means responsive to an output signal of the torsion torque sensor for producing an assist signal,

driving means responsive to the assist signal for producing a signal for driving the motor,

a steering angle sensor provided for detecting steering angle of a steering wheel for producing a steering angle signal,

first means responsive to said vehicle speed signal and said steering angle signal for producing a lateral acceleration signal dependent on lateral acceleration exerted on the motor vehicle while said vehicle speed signal is lower than a predetermined value,

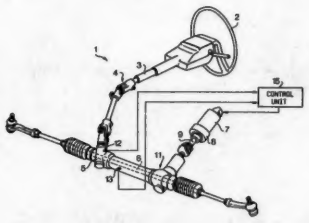
second means responsive to the lateral acceleration signal for producing a first return torque signal dependent on the lateral acceleration, and

third means for adding the first return torque signal to the assist signal to operate the motor dependent on the first return torque signal via said driving means to return the steering wheel, so as to prevent returning delay of the steering wheel at turning of a corner under high lateral acceleration.

4,875,541
ELECTRIC POWER STEERING SYSTEM

Saiichiro Oshita; Toyohiko Mouri; Tsutomu Takahashi, all of Ohta, and Shinji Itou, Oomama, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 203,286
Claims priority, application Japan, Jun. 8, 1987, 62-143865
Int. Cl.[4] B62D 5/04, 6/02
U.S. Cl. 180—79.1 2 Claims



1. In an electric power steering system having a motor operatively connected to a steering system for reducing steering effort, a torsion torque sensor provided for detecting torsion torque generating in the steering system in steering operation, assist means responsive to an output signal of the torsion torque sensor for producing an assist signal, driving means responsive to the assist signal for producing a signal for driving the motor to turn a steering wheel, a steering angle sensor provided for detecting steering angle of the steering wheel and for producing a steering angle signal, return means responsive to the steering angle signal for operating the motor to return the steering wheel, the improvement comprising:

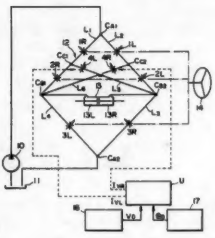
the assist means including first hysteresis providing means having a first dead zone and for producing the assist signal when the output signal of the torsion torque sensor exceeds the first dead zone; and wherein

said first hysteresis providing means has a hysteresis providing range and the first dead zone is moved within the hysteresis providing range when the output signal exceeds the first dead zone.

4,875,542
HYDRAULIC SYSTEM FOR VARIABLE ASSIST POWER STEERING SYSTEM

Koh Uchida, Sagamihara; Takashi Kurihara, Atsugi, and Makoto Miyoshi, Kawasaki, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 29, 1988, Ser. No. 213,022
Claims priority, application Japan, Jun. 29, 1987, 62-161576
Int. Cl.[4] B62D 5/083
U.S. Cl. 180—142 11 Claims



1. A variable assist power steering system for a vehicle including a steering wheel, a pump, a reservoir, a power cylinder adapted to be connected to a steering linkage, the power cylinder defining two chambers, comprising:

a control valve including valve elements relatively displaceable in response to a first predetermined variable in the form of a steering torque applied by the steering wheel to define therebetween two parallel fluid flow paths connected between the pump and the reservoir to produce a pressure differential between the two chambers of the power cylinder in response to said first predetermined variable, said two parallel fluid flow paths including connections communicating with the two chambers of the power cylinder, respectively, each of said two parallel fluid flow paths being divided into an upstream section and a downstream section with respect to said connection thereof;

each of said upstream and downstream sections of said two parallel fluid flow paths including a main variable flow restrictor having an orifice area variable with said first predetermined variable;

wherein

one of said upstream and downstream sections of each of said two parallel fluid flow paths includes an additional variable flow restrictor having an orifice area variable with said first predetermined variable and arranged in series with that one of said main variable flow restrictors which is included by said one section, said additional variable flow restrictor and said one main variable flow restrictor being disposed on the same side from one of said connections such that said additional variable flow orifice is disposed less far from said one connection than said one main variable flow restrictor is;

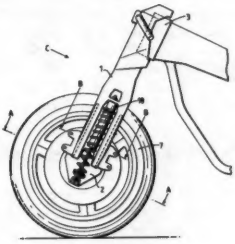
a pair of bypass paths, each having one end communicating with one of said two parallel fluid flow paths at said connection of said one parallel fluid flow path and an opposite end communicating with the other of said two parallel fluid flow path at a portion which is disposed more far from said connection of said the other parallel fluid flow path than said additional variable flow restrictor is but less far from said connection of said the other parallel fluid flow path than said main variable flow restrictor is;

each of said bypass paths has arranged therein at least one variable flow orifice valve which has an orifice area variable in a different manner from the manner of variation the orifice areas of said main and additional variable flow restrictors.

4,875,543
FRONT WHEEL SUSPENSION FOR MOTORCYCLES

Adrianus H. I. Verkuylen, Malden, Netherlands, assignor to Willem Peters, Weurt, Netherlands

Filed Jun. 3, 1988, Ser. No. 202,202
Claims priority, application Netherlands, Jun. 12, 1987, 8701364
Int. Cl.[4] B62K 25/04
U.S. Cl. 180—219 21 Claims



1. Front wheel suspension system for motorcycles compris-

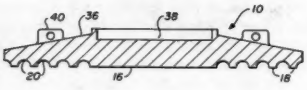
ing elements which are spring-mounted with respect to each other and are connected to the front wheel at one end and to the ball-head of the motorcycle on the other end, said suspension system characterised in having a spring-mounted element which is constituted by a single support arm, which arm is connected to the ball-head of the motorcycle and extends along only one side of the frontwheel and said support arm is provided with guide means and on the side adjacent the wheel being provided with a shift piece, to which shift piece is rotatably connected a shaft for the front wheel, said shift piece also being provided with guide means, the guide means of said support arm and of said shift piece cooperating with each other, spring means and a shock damper means connected on one end to the frontwheel through the shift piece and on the other end to the support arm; said shift piece being provided with a groovelike chamber opening at the side thereof opposite from the front wheel shaft, in which chamber a pair of guide ways are formed symmetrically of the front wheel shaft, said guide ways cooperating with a pair of guide ways formed on the outside of the support arm.

4,875,544

TRANSDUCER FOR INDUCING SEISMIC SIGNALS INTO AN ELASTIC MEDIUM

Tom P. Airhart, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 2, 1989, Ser. No. 306,633
Int. Cl.[4] G01V *1/047*
U.S. Cl. 181—113 **1 Claim**



1. In a transducer for inducing seismic waves into an elastic medium, including a coupling member adapted to couple energy of such transducer into said medium, the improvement comprising:

a plurality of discrete cleat members projecting from a lower surface of said coupling member, each said cleat member having lateral sides including arcuate portions generally tangent to said sides and to said lower surface of the coupling member, each said cleat member being truncated to provide a ground engaging surface disposed in a plane substantially parallel to said lower surface; and

a centrally-located, ground-engaging portion projecting from said lower surface and surrounded by said cleat members, said ground-engaging portion including a ground-engaging surface disposed in substantially the same plane as the ground-engaging surfaces on said cleat members, lateral sides including arcuate portions generally tangent to said lateral sides and to said lower surface on said coupling member, said ground-engaging surface on said ground-engaging portion being substantially greater in area than the ground-engaging surface on any of said cleat members, whereby the elastic medium is compressed preventing movement of said coupling member and directing the transducer force into the elastic medium to produce the seismic waves.

4,875,545

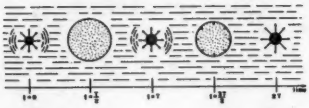
EXTERNAL BUBBLE-SUPPRESSION METHOD AND APPARATUS

Adrien P. Pascouet, 8925 Lipan, Houston, Tex. 77063

Continuation-in-part of Ser. No. 703,342, Feb. 20, 1985, abandoned. This application Nov. 6, 1987, Ser. No. 118,430
Int. Cl.[4] G01V *1/04*
U.S. Cl. 181—115 **20 Claims**

1. A method for substantially reducing a pressure pulse generated by a body of water having a first radial motion, the method comprising:

impulsively deflecting said first radial motion into an axial motion by the generation of a second radial motion, said first and second radial motions being substantially of opposite phase and having a substantially similar maximum displacement, the centers of said radial motion being separated by a distance substantially between one and two times the maximum displacement of said first radial motion.

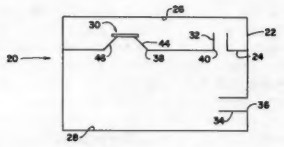


4,875,546

LOUDSPEAKER WITH ACOUSTIC BAND-PASS FILTER

Palo Krnan, Somerville, Mass., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Jun. 2, 1988, Ser. No. 201,539
Int. Cl.[4] A05K *5/00*
U.S. Cl. 181—160 **24 Claims**



1. A loudspeaker comprising:

enclosure means for enclosing an acoustically-reflective chamber;

barrier means coupled to said enclosure means for dividing said chamber into first and second acoustically-reflective subchambers, said barrier means comprising an opening;

electro-acoustical transducer means, mounted relative to said opening, for causing air enclosed in said first and second subchambers to vibrate acoustically in response to an electrical input signal, said transducer means comprising a vibratable diaphragm;

first acoustic energy radiating means for enclosing a first acoustic mass of air acoustically coupling said first subchamber with said second subchamber;

second acoustic energy radiating means for enclosing a second acoustic mass of air acoustically coupling said second subchamber with an atmosphere outside said enclosure means;

said first subchamber and said first acoustic energy radiating means being configured so that air enclosed in said first subchamber resonates acoustically with said first acoustic mass of air at a first acoustic resonant frequency so as to provide a first acoustic impedance which impedes excursions of said diaphragm;

said second subchamber and said second acoustic energy radiating means being configured so that air enclosed in said second subchamber resonates acoustically with said second acoustic mass of air at a second resonant frequency so as to provide a second acoustic impedance which impedes transmission of acoustic vibrations of frequencies higher than said second resonant frequency from said second subchamber to said outside atmosphere through said second acoustic mass of air.

4,875,547

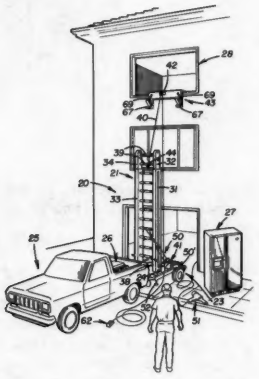
PORTABLE CONVEYOR SYSTEM WITH TELESCOPIC BOOM ASSEMBLY AND LOAD CARRYING APPARATUS

Philip T. Hanthorn, 1409 Carl Ave., Vallejo, Calif. 94590

Continuation-in-part of Ser. No. 75,410, Jul. 20, 1987, Pat. No. 4,793,437. This application Dec. 2, 1988, Ser. No. 278,809

Int. Cl.[4] E06C *5/04*; B66B *9/20*

U.S. Cl. 182—102 **19 Claims**



1. A portable conveyor system comprising

a boom assembly comprising a pair of extensible and retractable telescopic booms positioned in side-by-side relationship and a plurality of longitudinally spaced rungs interconnected between said booms to define a series of vertically spaced and horizontally disposed supporting surfaces,

support means having lower ends of said booms mounted thereon to extend said boom assembly upwardly and forwardly from said support means, and

a mobile primary load carrier means mounted for movement on the supporting surfaces of said rungs, said primary load carrier means including

a frame,

a load-carrying primary platform pivotally mounted on said frame,

first adjustment means for selectively pivoting said primary platform to an acute angle relative to said frame,

a hitch mounted forwardly on said frame for attachment to a cable of a winch, and

second adjustment means for selectively moving said hitch vertically relative to said frame to control the disposition of said load carrier on the supporting surfaces of said rungs.

4,875,548

JUMP RESCUE APPARATUS

Peter Lorsbach, Schwertstrasse 59, 5650 Solingen 1, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 861,060, May 8, 1986, abandoned. This application Nov. 24, 1987, Ser. No. 129,384

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516676

Int. Cl.[4] F16K *17/36*

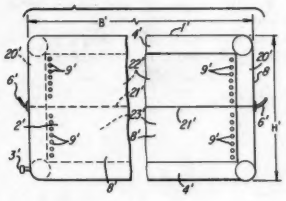
U.S. Cl. 182—137 **1 Claim**

1. A jump rescue apparatus, comprising the improvement in combination therewith including:

a pneumatic framework made of inflatable tubes; and

a flexible and substantially inextensible tensioned fabric covering that extends around said pneumatic framework of inflatable tubes disposed below said covering which is supported thereby, with said covering having a pre-tensioned jump surface onto which a person who is to be rescued can jump safely, and with said pre-tensioned jump surface including edges and being supported only along the edges by said pneumatic framework in a tensioned condition; and with an approximately quadratic outline of said jump surface there is a ratio relationship of the height to the width of the apparatus within a range of approximately 1:1.7 to 1:2.5, preferably amounting to 1:2;

said pneumatic framework of inflatable tubes having a starting configuration and being elastically yieldingly deformable to accommodate a person jumping onto said pre-tensioned jump surface for energy dissipation in such a way that the person who is jumping is received in an elastically soft manner rather than in a spring-like manner, and after said person is no longer on said pre-tensioned jump surface, said pneumatic framework of inflatable tubes being adapted automatically and independently to return said covering that is reset rapidly to the starting configuration and returned substantially back to the position it had prior to the time the person jumped onto said pre-tensioned jump surface to allow use thereof again as quickly as possible to rescue another person; said tensioned fabric covering being provided with at least one air-passage means embodied particularly as flow-restriction means provided for air through-passage in a flow-throttling operation although open reciprocally irrespective of whether air is to flow in or out in connection with said pneumatic framework of inflatable tubes to obtain combination effect of said pneumatic framework via support only along edges coupled with said air-passage means, said air-passage means only being located in corner regions of the apparatus;



in a state of rest, said covering being provided with surfaces that are supported under pre-tension by said framework,

said jump surface of said covering being provided with peripheral edges, and said framework includes elements that contact said covering at least in the region of said peripheral edges of said jump surface;

said covering being provided with corners, and said elements of said framework contact said corners, said covering having a bottom surface opposite said jump surface thereof, with both said bottom surface and said jump surface being respectively provided with peripheral edges; said inflatable tube framework includes at least one continuous closed frame, with at least one of said jump surface and said bottom surface having its peripheral edges adjacent one of said closed frames, one of said closed frames being located along said peripheral edges of said jump surface; said framework further including narrow support members for supporting said last-mentioned closed frame;

said air-passage means including a plurality of small openings for allowing air to leave said covering;

all of said inflatable tubes being interconnected, and

an air inlet valve that communicates with one of said tubes and is disposed remote from said jump surface;

said inflatable tubes of said framework being effective practically exclusively in the edge region of said jump surface in such a way that the center of the latter is more yielding than the edge region thereof;

said air-passage means being embodied particularly as flow-restriction means open reciprocally irrespective of whether air is to flow in or out in connection with said pneumatic framework; said air-passage means being holes having a diameter in a range of 40 mm to 80 mm, preferably 60 mm, and for each cubic meter of air content volume of the apparatus there being a range of four to seven holes being provided therewith, said air-passage means only being located in corner regions of the apparatus;

said air-passage means being located at least on one side of supports located in corner regions of the apparatus;

said air-passage means being arranged in vertically extending rows one above the other; and

a hollow space inside the apparatus that is subdivided by a partition wall extending transversely and practically air impermeable, said partition wall being located at substantially half the height level of the apparatus overall, whereby such hollow space is subdivided into two chambers formed on opposite sides of said partition wall and having holes of equal number arranged as said air-passage means of each of said two chambers; and

said transversely extending partition wall having edges securely connected with side walls of said apparatus and further including handles arranged and fastened externally at said connection locations between the transversely extending wall with respect to said side walls of the apparatus.

4,875,549

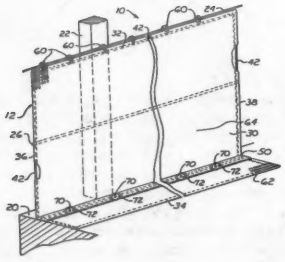
DEBRIS BARRIER

David S. Denny, Middle Haddam; Edward C. R. Metzger, Deep River; John Rexroad, Old Saybrook, and William Glynn, West Suffield, all of Conn., assignors to SINCO, Inc., East Hampton, Conn.

Continuation of Ser. No. 174,006, Mar. 28, 1988, Pat. No. 4,815,562. This application Mar. 27, 1989, Ser. No. 328,627

Int. Cl.[4] E04G *21/32*

U.S. Cl. 182—138 13 Claims



1. A debris barrier system for high rise construction projects adapted for installation in connection with a safety cable suspended at a generally uniform height above a floor slab along at least a portion of the perimeter vicinity thereof comprising:

a flexible netting having a first border portion and a second transversely spaced border edge separated by a distance greater than said height;

clip means for connecting said netting to said cable at longitudinally spaced locations along said netting to suspend said netting so as to form a flexible vertical panel and a flap horizontally positionable on said floor slab;

a flexible anchoring strip spaced from said first border portion a distance approximately equal to the cable height and extending longitudinally along said netting; and

fastener means for fastening said netting to said floor slab at longitudinally spaced positions along said flexible anchoring strip.

4,875,550

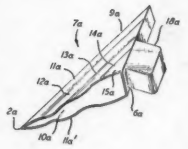
GAFF

James J. Rullo, Elmira, N.Y., assignor to Buckingham Manufacturing Company, Inc., Binghamton, N.Y.

Filed Dec. 13, 1988, Ser. No. 283,683

Int. Cl.[4] A63B *27/00*

U.S. Cl. 182—221 14 Claims



1. A gaff for use with, and attachment to, a leg iron, that is characterized by improved penetration into pole or tree materials, said gaff comprising:

a gaff body having a forward penetrating section and a rearward section for attaching said body to said leg iron, said forward penetrating section including in sequential order, a means defining a point of penetration followed by a first relief section, thereafter followed by a first expansion section, followed by a second relief section, said point of penetration and said expansion section causing a compression in the pole or tree materials during the penetration of said gaff body into said pole or tree materials, and said subsequent relief sections allowing said compressed materials to decompress as said gaff body continues to penetrate the pole or tree.

4,875,551

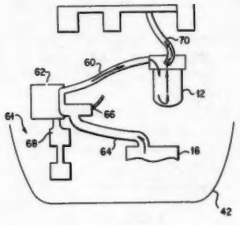
PRE-LUBRICANT OIL PRESSURE ADAPTER

John F. Lulich, Pittsburgh, Pa., assignor to R. P. M. Industries, Washington, Pa.

Filed Oct. 13, 1987, Ser. No. 108,161

Int. Cl.[4] F01M *11/03*

U.S. Cl. 184—6.3 10 Claims



1. An apparatus for providing oil and oil pressure to an engine having an oil system before the engine engages comprising:

an oil filter;

an oil pump for pumping oil and raising the oil pressure in the engine;

a linkage having at least one linkage chamber for linking the oil filter and the oil pump so oil pumped by the oil pump is provided only to the oil filter via the linkage chamber which fluidically connects the oil pump and the oil filter, said linkage also linking the oil filter and the engine oil system at a first location, said linkage having at least a first opening and a second opening, said second opening allowing oil to pass from the engine oil system to the oil filter to be filtered;

an O-ring assembly that has a channel, said O-ring assembly being mounted in the engine and connecting the engine oil system at the first location with the linkage by way of the first opening so oil that has been filtered by the oil filter passes through the channel of the O-ring assembly into the engine oil system;

means for starting the pump and engine;

means for delaying the starting of the engine until there is oil pressure in the engine oil system, said delay means disengaging the pump after the engine engages, said delay means electrically connected to the starting means; and

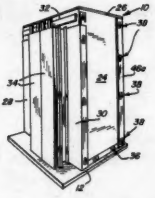
supply means for fluidically connecting the oil pump to the engine oil system at a second location.

4,875,552

MODULAR ELEVATOR CAB CONSTRUCTION

Stephen W. Smith; Gilbert E. Londeen, both of Arkansas City, and Christopher Lair, Wichita, all of Kans., assignors to Montgomery Elevator Company, Moline, Ill.

Division of Ser. No. 891,532, Jul. 29, 1986, Pat. No. 4,779,707.
This application Jul. 1, 1988, Ser. No. 214,479
Int. Cl.[4] B66B *9/00*; E04B *1/38*
U.S. Cl. 187—1 R **1 Claim**



1. A modular elevator cab construction for assembly onto a platform of an elevator stile substantially from within the area of the cab, comprising:

a rear wall panel and two side wall panels, including support means projecting from one of the wall panels at a juncture between the rear wall panel and each of the side wall panels; and

complementary interengaging hanger means on backsides of adjacent panels for assembling the panels in proper right-angular juxtaposition, the hanger means including a plurality of sets of receptacle means and complementary hanger members, the receptacle means of each set being on one of the support means and the adjacent panel and the respective hanger member of each set being on the other of the support means and the adjacent panel at each said juncture, wherein said support means comprise angle plates with a first arm secured to an outer surface of a panel and a second arm lying outside an outer surface of an adjacent panel, said receptacle means comprise apertures in the support means, and said hanger members are located on the backside of said adjacent panel and comprise spring hooks for positioning in the apertures, the spring hooks being spring loaded in a direction perpendicualr to a plane including the adjacent panel.

4,875,553

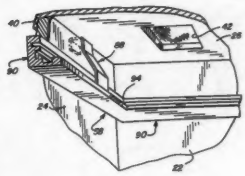
MODULAR ELEVATOR CAB CONSTRUCTION

Stephen W. Smith; Gilbert E. Londeen, both of Arkansas City, and Christopher Lair, Wichita, all of Kans., assignors to Montgomery Elevator Company, Moline, Ill.

Division of Ser. No. 891,532, Jul. 29, 1986, Pat. No. 4,779,707.
This application Jul. 1, 1988, Ser. No. 214,478
Int. Cl.[4] B66B *11/02*; E04B *5/52*
U.S. Cl. 187—1 R **5 Claims**

1. A modular elevator cab construction for assembly onto a platform of an elevator cage substantially from within the area of the cab, comprising:

a plurality of wall panels bounding at least a portion of the cab area, the wall panels having top edges;



support means for supporting a drop ceiling of the elevator cab; and

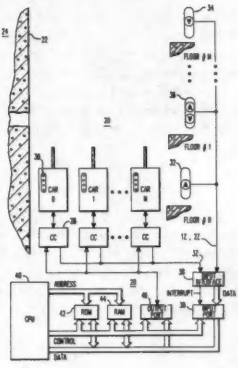
means for hanging the drop ceiling support means from the top edges of said wall panels.

4,875,554

DYNAMIC SELECTION OF ELEVATOR CALL ASSIGNMENT SCAN DIRECTION

Robert C. MacDonald, W. Caldwell, N.J., and Elsa Abrego, Manhattan, N.Y., assignors to Inventio AG, Hergiswil, Switzerland

Filed Aug. 31, 1988, Ser. No. 238,941
Int. Cl.[4] B66B *1/18*
U.S. Cl. 187—124 **8 Claims**



1. A method for assigning up and down hall calls registered from floors of a building to a plurality of elevator cars which travel in up and down directions in the building to collectively provide elevator service, comprising the steps of:

determining the number (UPCOUNT) of elevator cars providing elevator service in the up travel direction,

determining the number (DNCOUNT) of elevator cars providing elevator service in the down travel direction,

and selecting a sequence for assigning up and down hall calls in response to a predetermined relationship between UPCOUNT and DNCOUNT.

4,875,555

PATIENT LIFTING DEVICE

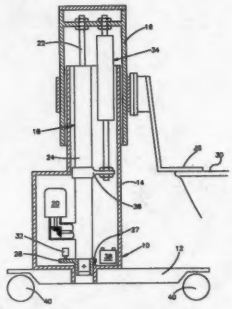
Jan A. Johansson, Bråås; Jan I. Jönsson, Moheda, and Björn T. Lindström, Stockholm, all of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 27, 1987, Ser. No. 126,024

Claims priority, application Sweden, Dec. 29, 1986, 8605592

Int. Cl.[4] B66B 9/20; A61G 7/10

U.S. Cl. 187—9 R 3 Claims



1. A patient lifting device comprising a lower part having a base and a lower column portion, an upper part having an upper column portion, a lifting platform, means connecting said platform to said upper column portion whereby said platform is elevated and lowered relative to said lower column portion, an electrically driven and rectilinearly extendable jack having a top part and a bottom part, said jack being mounted between said column portions to selectively raise and lower said upper column portion with said platform, one part of said jack being fixed to one of said column portions, the other part of said jack being anchored with limited axial play to the other said column portion thereby permitting an axial relative movement of said jack at said anchoring place when the jack continues to retract after the platform upon lowering has been stopped by an obstacle, means utilizing said relative movement to interrupt electrical current to said jack thereby stopping it, and a gas spring arranged in parallel to work in tandem with said jack to reduce the working load on said jack by pre-loading the jack, with one end of said gas spring being fixed to said part of said jack which is anchored with limited axial play and the other end of said gas spring being fixed relative to the other part of said jack.

4,875,556

BRAKE ARRANGEMENT

Steven Shaw, Stuttgart, and Elmar Weiss, Wurmberg, both of Fed. Rep. of Germany, assignors to Dr. Ing H.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,689

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1987, 3738764

Int. Cl.[4] F16D 65/20

U.S. Cl. 188—72.4 7 Claims

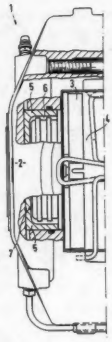
1. A brake arrangement for a disk brake of a vehicle comprising:

brake caliper means;

brake pad means guided in the brake caliper means on both sides of a brake disk;

hydraulically actuated actuating piston means operatively connected with the brake pad means and having a bore in a piston end face facing an oppositely disposed brake pad surface of the brake pad means, the bore having both circumferential and bottom surfaces; and

an insert member having a body portion retained in the bore with both radial and axial play with respect to the inner circumferential and bottom surfaces of the bore and a flange covering the piston end face of the actuating piston means, an inner circumferential surface of the flange being in frictional connection with the piston end face of the actuating piston means and an outer surface of the flange



being in frictional connection with the oppositely disposed brake pad surface of the brake pad means, the insert member consisting of a metal having a relatively high specific weight.

4,875,557

BRAKE PLAY RESETTING DEVICE

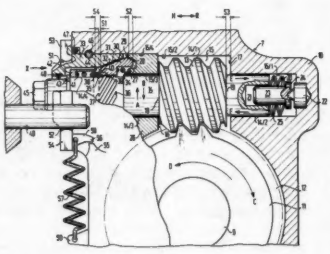
Faust Hagin; Hans Drewitz, and Manfred Krenner, all of Munich, Fed. Rep. of Germany, assignors to MAN Nutzfahrzeuge GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 15, 1988, Ser. No. 285,197

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743206

Int. Cl.[4] F16D 65/56

U.S. Cl. 188—79.55 16 Claims



1. In a brake play resetting device for a braking mechanism in which an actuator moves an adjusting means during a braking operation to apply contact between brake linings and a member to be braked, and releases the adjusting means for return to its initial position after the braking operation is completed, the adjusting means having a setting shaft drivingly engaged with a drive wheel adapted to apply brake force to the brake linings, said setting shaft being axially displaceable between axially spaced abutments, unidirectional coupling means for rotating said setting shaft to reduce play between the linings and the member to be braked when said play exceeds a determined amount, and spring means acting on said shaft for yielding when a predetermined braking pressure is exceeded to permit displacement of the setting shaft between said abutments, the improvement wherein said unidirectional coupling means comprises a setting member displaceably supported by

the adjusting means, abutment means positioned for being contacted by said setting member upon movement of the adjusting means during a braking operation, a turnable conical coupling member in driving engagement with said setting shaft and axially displaceable between a first position in coupled engagement with said setting member and a second position released from the setting member, and means for preventing turning of the coupling member during a part of the axial displacement movement of the setting shaft between said abutments to cause a relative slip of the driving engagement between the setting shaft and the coupling member and thus further to cause a small increase in the play between the brake linings and the member to be braked.

4,875,558

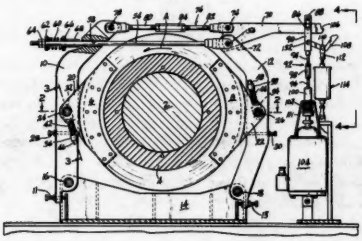
SAFETY BRAKE FOR ESCALATORS

Dietmar Berkhan, Neustadt, and Martin Mehlert, Nienstaedt, both of Fed. Rep. of Germany, assignors to Otis Elevator Company, Farmington, Conn.

Filed Mar. 16, 1989, Ser. No. 324,078

Int. Cl.[4] B60T *13/04*

U.S. Cl. 188—171 **12 Claims**



1. For use in controlling rotation of a shaft, a braking assembly of the type having a brake disk fixed to the shaft; brake shoes straddling the brake disk and mounted on respective brake levers; and a connecting rod and spring assembly interconnecting said brake levers for biasing said brake shoes toward said brake disk, the improvement comprising:

(a) a control lever connected to each of said brake levers for controlling movement of said brake levers toward and away from said brake disk;

(b) sear means for engaging said control lever to releasably hold the latter in a brake-off position wherein said brake shoes are held away from engagement with said brake disk;

(c) spring means for biasing said sear means away from engagement with said control lever; and

(d) actuator means operable to selectively resist said spring means to enable said sear means to retain said control lever in said brake-off position, whereby disabling of said actuator means enables said spring means to move said sear means out of engagement with said control lever to allow said brake shoes to engage said brake disk stopping rotation of the shaft.

4,875,559

TREAD BRAKE UNIT

Keith W. Langley, Bath, and Jack Washbourn, Axminster, both of England, assignors to Westinghouse Brake & Signal Holdings Ltd., Chipperham, England

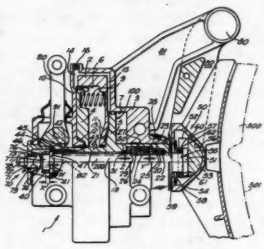
Filed Jan. 23, 1989, Ser. No. 300,107

Claims priority, application United Kingdom, Jan. 27, 1988, 8801791

Int. Cl.[4] F16D *65/32, 65/66*

U.S. Cl. 188—203 **6 Claims**

1. A tread-brake unit comprising, as a unitary structure, a brake shoe for engagement with the tread of a vehicle wheel, a brake actuator having an output member via which the brake shoe can, firstly, be moved into engagement with the wheel tread and, thereafter, a braking force generated by the actuator can be transmitted to the brake shoe, and a slack adjuster by which clearance between the brake shoe and the wheel tread, in the "released" condition of the unit, can be maintained substantially constant, the slack adjuster having a pair of fast-threaded nuts, each such nut being threadedly engaged with and rotatable on the output member of the actuator, wherein



the actuator includes a piston of non-circular peripheral configuration that is within a cylinder of the actuator that has a complementary-shaped internal wall whereby the piston is non-rotatable with respect to but is slidable in the cylinder, a piston rod rotationally fast with the piston being of tubular form, and the slack adjuster including securing means for non-rotatably and releasably securing one of the nuts to the tubular piston rod thereby to prevent rotation of this nut relative to the output member.

4,875,560

DAMPING FORCE ADJUSTABLE HYDRAULIC SHOCK ABSORBER

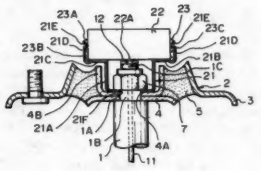
Tomio Imaizumo, Kanagawa, Japan, assignor to Tokico Ltd., Kanagawa, Japan

Filed Sep. 17, 1987, Ser. No. 98,055

Claims priority, application Japan, Sep. 19, 1986, 61-143531[U]; Sep. 20, 1986, 61-144872[U]

Int. Cl.[4] F16F *5/00, 9/00, 9/46*; F16B *2/20*

U.S. Cl. 188—319 **3 Claims**



1. A damping force adjustable hydraulic shock absorber assembly comprising:

a piston rod to be projected from a cylinder of a shock absorber;

an actuator for adjusting the level of damping force in the shock absorber, said actuator having a bottom portion and an axially extending outer peripheral portion;

a casing including a bottom portion secured to the projecting end portion of said piston rod, a first rising portion which extends upward from the outer peripheral edge of said bottom portion, a flange portion which extends outward from the upper end of said rising portion, said bottom portion of said actuator being placed on said flange

portion, and a second rising portion which extends upward from the outer edge of said flange portion, said second rising portion receiving at least a part of the outer peripheral portion of said actuator to prevent horizontal movement of said actuator;

said second rising portion of said casing including at least one retaining portion which is resiliently deformable in a radial direction of said casing and having a projection projecting inwardly thereof;

said actuator being provided on the outer periphery thereof with a ring-shaped engaging member projecting outwardly from said outer periphery;

said engaging member being engageable with said retaining portion by engagement of said projection of said retaining portion with an upper edge of said ring-shaped engaging member to retain said actuator on said flange portion of said casing while preventing upward movement of said actuator relative to said flange portion; and

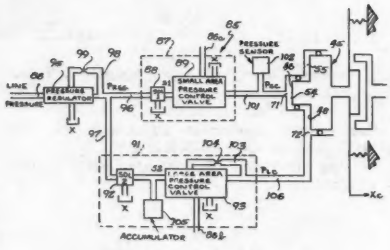
said retaining portion and said engaging member being formed such that, as said actuator is pressed into said casing, said retaining portion is first deformed outwardly so that said projection is resiliently moved outwardly over said ring-shaped engaging member and then moves back inwardly when said projection passes said upper edge of said engaging member so that said projection engages with said upper edge.

4,875,561

DUAL CLUTCH APPLICATION AREA AND CONTROL

Karl F. Schneider; William J. Haley, both of Ithaca, N.Y., and Alan L. Miller, Chicago, Ill., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Oct. 9, 1987, Ser. No. 107,143
Int. Cl.[4] B60K *41/02*; F16D *25/14*
U.S. Cl. 192—0.033 **14 Claims**



1. A clutch assembly for actuation of a transmission for an engine having a relatively high torque at low output speed, comprising a dual area clutch having a single apply piston in which is incorporated a small apply area and a large apply area, separate sources of hydraulic pressure for the small apply area and the large apply area, and a control arrangement for controlling the two separate sources of hydraulic pressure to the single apply piston to initially apply pressure to the small apply area followed by application of a second pressure of a higher value to the large apply area.

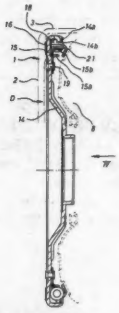
4,875,562

LOCK-UP DAMPER FOR TORQUE CONVERTER

Shinji Fujimoto, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Filed Jan. 28, 1988, Ser. No. 149,305
Claims priority, application Japan, Feb. 16, 1987, 62-21649[U]
Int. Cl.[4] F16D *3/50*; F16H *45/02*
U.S. Cl. 192—3.28 **4 Claims**

1. A lock-up damper for a torque converter having a turbine wheel, said lock-up damper being disposed between an input side housing of said torque converter and said turbine wheel, said lock-up damper having a retaining plate fastened to a piston plate of said lock-up damper, said piston plate having a facing pressable in an axial direction into engagement with said housing and having torsion springs, torsion spring outside holders formed on an outer peripheral end of said piston plate, torsion spring inside holders facing said outside holders from a radially internal side and formed on an outer peripheral end of



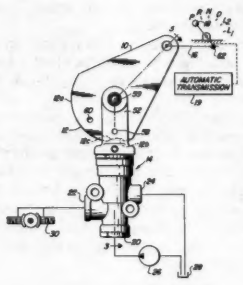
said retaining plate, said torsion springs each being held by said outside and inside holders from the radially external and internal sides of said springs, projections mating with the rotational direction ends of said torsion springs formed on the outer peripheral ends of said retaining and piston plates, respectively, a driven plate of said turbine wheel mated with one rotation-direction end of said torsion springs, said torsion springs being freely compressible between said projections.

4,875,563

SHIFT LEVER ACTIVATED PARKING BRAKE

Scott A. Larson, Waterloo, Iowa, and Duane R. Johnson, Wellington, Ohio, assignors to Deere & Company, Moline, Ill.

Filed Jan. 19, 1988, Ser. No. 145,343
Int. Cl.[4] B60K *41/26*
U.S. Cl. 192—4 A **4 Claims**



1. A system for activating and de-activating a parking brake, comprising:

a spring-activated, hydraulically de-activated parking brake;

a valve having a first position connecting said brake to a source of pressurized fluid to deactivate said brake and a second position draining fluid from said brake to activate said brake, said valve being biased towards said second position, and said valve comprising:

(i) a valve body having a central bore formed therein;

(ii) a spool in said valve body separating said central bore into first and second chambers, said spool having a

passage formed therein for connecting said chambers when said valve is in said second position, said passage being blocked off by walls of said bore when said valve is in said first position;

(iii) a first port connecting said first chamber to a drain for hydraulic fluid;

(iv) a second port connecting said second chamber to said source of pressurized fluid; and

(v) a third port connecting said second chamber to said brake;

cam follower means for controlling the position of said valve;

a cam having a cam surface for controlling the position of said cam follower means;

cam support means for holding said cam in a predetermined position relative to said valve, whereby said cam follower and cam surface are precisely positioned;

an automatic transmission having a PARK position and at least one other position;

a gear shift lever for moving said automatic transmission between said PARK position and said at least one other position; and

a mechanical linkage interconnecting said gear shift lever and said cam, whereby movement of said gear shift lever causes proportional movement of said cam, said cam surface being shaped to cause said cam follower to move said valve to said second position when said gear shift lever is moved to said PARK position, and to said first position when said gear shift lever is moved to any other position.

4. A method of assembling a system for activating and de-activating a parking brake having:

a spring-activated, hydraulically de-activated parking brake;

a valve having a first position connecting said brake to a source of pressurized fluid to deactivate said brake and a second position draining fluid from said brake to activate said brake, said valve being biased towards said second position;

cam follower means for controlling the position of said valve;

a cam having a cam surface for controlling the position of said cam follower means;

cam support means for holding said cam in a predetermined position relative to said valve, whereby said cam follower and cam surface are precisely positioned;

an automatic transmission having a PARK position and at least one other position;

a gear shift lever for moving said automatic transmission between said PARK position and said at least one other position; and

a mechanical linkage interconnecting said gear shift lever and said cam, whereby movement of said gear shift lever causes proportional movement of said cam, said cam surface being shaped to cause said cam follower to move said valve to said second position when said gear shift lever is moved to said PARK position, and to said first position when said gear shift lever is moved to any other position;

the method comprising:

forming a first alignment bore in said cam support means;

forming a second alignment bore in said cam at a position therein such that when said first and second alignment bores are aligned, said cam is in a position corresponding to a predetermined position of said gear shift lever;

aligning said alignment bores and inserting a pin therethrough to hold said cam and cam support in fixed positions relative to each other;

placing said gear shift lever in said predetermined position;

adjusting a length of said mechanical linkage to the appropriate length to interconnect said cam and said gear shift lever while in said positions, and interconnecting the same; and

removing said pin from said bores.

4,875,564

SPRAY CLUTCH WITH A DOUBLE CAGE

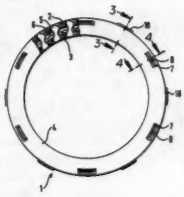
Hermann Leitz, Heidelberg; Erich Krayer, Oftersheim, and Rudolf Kohler, Sandhausen, all of Fed. Rep. of Germany, assignors to Borg-Warner Automotive GmbH, Fed. Rep. of Germany

Filed May 17, 1988, Ser. No. 194,747

Claims priority, application European Pat. Off., May 20, 1987, 87107317.7

Int. Cl.[4] F16D *15/00, 41/07*

U.S. Cl. 192—45.1 **18 Claims**



1. A one-way sprag clutch having a double cage between inner and outer races including an outer cage ring and an inner cage ring each cage ring having opposite sides, the improvement comprising that the inner cage ring is formed of metal and the outer cage ring is formed of plastic.

4,875,565

COUPLING WITH TWO CLUTCHES, ESPECIALLY FOR LOOMS

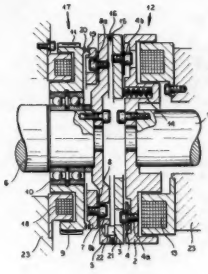
Erminio Depoli, Crema, Italy, assignor to Baruffaldi S.p.A., San Donato Milanese, Italy

Filed Mar. 9, 1988, Ser. No. 165,790

Claims priority, application Italy, Dec. 30, 1987, 23268 A/87

Int. Cl.[4] D03D *51/02*; F16D *27/12*

U.S. Cl. 192—48.2 **6 Claims**



1. A coupling apparatus, especially for a loom, said apparatus comprising:

a housing;

a driving shaft mounted in said housing and rotatable about an axis of rotation;

a driven shaft coaxial with said driving shaft, said driven shaft being mounted in said housing and being formed with a flange extending radially therefrom, said driving and driven shafts extending oppositely beyond said housing and being aligned;

a first clutch, said first clutch being formed with a first rotor coaxial with said driving shaft and rigidly connected thereto, said first rotor being provided with a first annular groove,

a first annular electromagnet rigidly attached to said housing for producing electromagnetic force, said first electromagnet having an end spaced from said housing and inner and outer sides, said first electromagnet being received by said first annular groove and enclosing said inner and outer sides and said end of said first electromagnet, so that said first rotor and said first electromagnet define an air gap of a constant width all along said sides and said end, and

an axially movable first annular armature rotatably fixed on said first rotor, said first annular armature being coaxial with said driving shaft and being connected by a first annular resilient means with said first rotor for providing continuous torsional connection of said first armature with said first rotor;

a second clutch provided with a second rotor coaxial with said driven shaft, said second rotor being rotatably mounted on but axially fixed on said driven shaft and being formed with a second annular groove, said second clutch including:

a second electromagnet fixedly attached to said housing, said second electromagnet being received in said second annular groove and having an end and inner and outer sides enclosed by said second annular groove so that said inner and outer sides and said end of said second electromagnet define another air gap of a constant width with said second rotor, and

a second annular armature axially shiftable between said second rotor and said flange and coaxial with said driven shaft, said second armature being keyed on said flange, said second armature being provided with second annular resilient means connecting said flange with said second armature, so that said second armature shifts axially without play upon the energizing said second electromagnet;

coupling means on said axially movable first armature, said second armature, said flange and said second rotor for successive engaging - disengaging operations therebetween, so that upon energization of said first electromagnet, said axially movable first armature is disengaged from said flange, disengaging said driving and said driven shafts and upon energization of said second electromagnet said second armature is connected to said second rotor for reversed independent rotation of said driven shaft.

4,875,566

GEAR SYNCHRONIZER MECHANISM

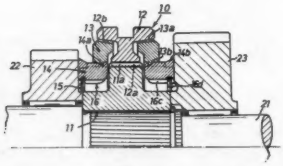
Masaki Inui; Shozo Okuda, and Masaki Hosono, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Dec. 16, 1987, Ser. No. 134,069

Claims priority, application Japan, Dec. 16, 1986, 61-299710; Dec. 17, 1986, 61-300718; Dec. 19, 1986, 61-196632; Dec. 19, 1986, 61-196633

Int. Cl.[4] F16D *23/06*

U.S. Cl. 192—53 F **6 Claims**



1. A gear synchronizer mechanism comprising a gear member rotatable on a transmission shaft and having a cylindrical hub portion formed with external spline teeth, a hub member formed with external spline teeth and being mounted on said shaft for rotation therewith, a clutch sleeve formed at one side thereof with a internal conical surface and at an inner periphery thereof with internal spline teeth in continual engagement with the external spline teeth of said hub member and being axially shiftable on said hub member to be engaged at the internal spline teeth thereof with the external spline teeth of said cylindrical hub portion, and a synchronizer ring formed with an external conical surface for frictional engagement with the internal conical surface of said clutch sleeve and being axially movable on said cylindrical hub portion to establish synchronization between said shaft and said gear member when engaged with said clutch sleeve, said synchronizer ring being formed at an inner periphery thereof with a plurality of circumferentially spaced internal radial projections,

said cylindrical hub portion of said gear member being formed at an inner periphery thereof with an annular groove and having a plurality of circumferentially equally spaced radial grooves defined therein, each of which receives therein a corresponding radially movable key element, said key elements being supported by a radially contractible annular spring disposed within the annular groove of said cylindrical hub portion and resiliently engaged with said synchronizer ring under the biasing force of said spring in such a manner as to restrict axial movement of said synchronizer ring in shifting operation of said clutch sleeve, each of said key elements being formed with a transverse recess which receives a said internal radial projection of said synchronizer ring to restrict axial movement of said synchronizer ring under the biasing force of said spring.

4,875,567

COIN VALIDATION DEVICE

Stephen Fitton, Firwood Park, United Kingdom, assignor to Neo Electronics Limited, Oldham, United Kingdom

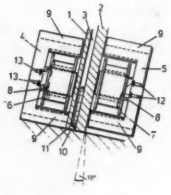
PCT No. PCT/GB86/00658, § 371 Date Aug. 17, 1987, § 102(e) Date Aug. 17, 1987, PCT Pub. No. WO87/02809, PCT Pub. Date May 7, 1987

PCT Filed Oct. 24, 1986, Ser. No. 76,208

Claims priority, application United Kingdom, Oct. 30, 1985, 8526686

Int. Cl.[4] G07D *5/08*

U.S. Cl. 194—318 **8 Claims**



1. A coin validation device comprising

a channel along which a coin to be validated is caused to pass, the channel defining a first axis, and

a pair of magnetic cores located on opposite sides of the channel and at the same position along the lnegth of the channel so thta a coin to be validated will pass therebetween, the cores being of substantially the same size and each being E-shaped so as to define a central leg and two outer legs extending towards the corresponding legs of the other core in a direction substantially parallel to a second axis,

the central leg of one core supporting an exciting coil, and

the central leg of the other core supporting a detector coil, characterized in that

the channel is limited at one edge by a surface that in use is

inclined to the horizontal so as to define a predetermined inclined path down which the coin is caused to roll,

the outer legs of each core are spaced apart in a direction perpendicular to the length of the channel along a third axis, the first, second and third axis being mutually perpendicular, and

one outer leg of each core is located adjacent the said one edge of the channel.

4,875,568

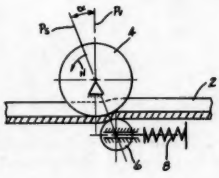
ESCALATOR HANDRAIL DRIVE

Dietrich E. Hermann, Vechelde, and Ralf Holzhauer, Wetter, both of Fed. Rep. of Germany, assignors to Otis Elevator Company, Farmington, Conn.

Filed Jan. 5, 1989, Ser. No. 294,532

Int. Cl.[4] B65G *15/00*

U.S. Cl. 198—335 **6 Claims**



1. A device for moving a handrail component of a people conveying assembly, said device comprising:

(a) a powered driving roller for contacting one surface of said handrail to impart a driving force thereto resulting from rotation of said driving roller about its axis;

(b) a contact pressure roller for contacting another surface of said handrail opposite said one surface thereof, said pressure roller being rotatable about its axis and operable to bias said handrail against said driving roller; and

(c) spring means for biasing said contact pressure roller toward said driving roller, said spring means biasing said axis of said contact pressure roller in a plane substantially parallel to planes containing said handrail, and in a direction which is opposite to the direction of movement of said handrail.

4,875,569

CONCRETE DELIVERY SYSTEM

Robert F. Oury, Gilberts, and Joseph Gallione, Naperville, both of Ill., assignors to Rotec Industries, Inc., Elmhurst, Ill.

Filed Apr. 14, 1988, Ser. No. 181,735

Int. Cl.[4] B65G *47/44*

U.S. Cl. 198—36 D **8 Claims**

1. Apparatus for delivering concrete to two spaced deposition points comprising:

a funnel-shaped hopper having a conical side wall,

a pair of opposed outlet openings in the hopper wall at the lower end thereof,

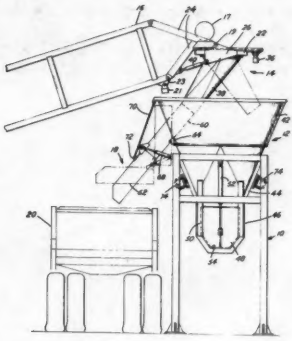
two doors each slidably mounted on said hopper wall adjacent each said outlet openings,

actuating means for moving said doors from fully closed to fully open positions for metering the volume of concrete discharged from said openings,

separate conveyor means disposed below each of said openings for carrying concrete from the hopper to spaced deposition points,

an inclined rotatable chute disposed above said hopper for discharging concrete into said funnel-shaped hopper,

said inclined rotatable chute being tilted at an angle from the vertical so as to deposit the concrete evenly on the conical side wall of said funnel-shaped hopper as said



chute rotates and a means for rotating said rotatable chute.

4,875,570

APPARATUS FOR TRANSFERRING A LITHOGRAPHIC PLATE

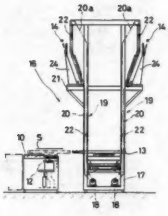
Takatsugu Kyoo, Iruma, Japan, assignor to Tusbakimoto Chain Co., Japan

Filed May 2, 1988, Ser. No. 189,425

Claims priority, application Japan, Jul. 30, 1987, 62-115844[U]

Int. Cl.[4] B65G *15/10*

U.S. Cl. 198—408 **6 Claims**



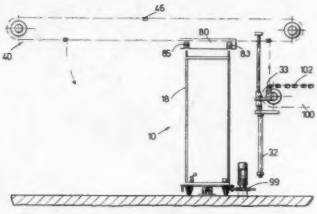
1. Apparatus for transferring a lithographic plate (S) from a horizontal conveyor (10) to an overhead conveyor (14), comprising:

elevating means (19) continuously driven in one direction around an endless vertical path and having a pair of hooks (22) for engaging a folded end portion (S1) of the lithographic plate at laterally spaced locations to support the lithographic plate between said hooks for movement with the elevating means;

an obliquely disposed plate bed (24) adjacent a descending portion along a path of the elevating means for receiving the plate as it descends with the elevating means, the path being obliquely disposed adjacent the plate bed; and,

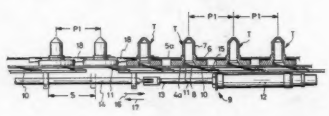
means (23) adjacent the plate bed for guiding the hooks laterally outwardly of the lithographic plate as the hooks descend along the obliquely disposed path, thereby releasing said lithographic plate and depositing the plate on the plate bed.

4,875,571
UNLOADING METHOD AND APPARATUS FOR A CABLE FINISHING SYSTEM
Helmut Kolodziej, Maintal, Fed. Rep. of Germany, assignor to Statomat-Globe Maschienenfabrik GmbH, Niederdorfelden, Fed. Rep. of Germany
Filed Dec. 18, 1987, Ser. No. 134,799
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, 3643201
Int. Cl.[4] B65G *47/26*
U.S. Cl. 198—431 9 Claims



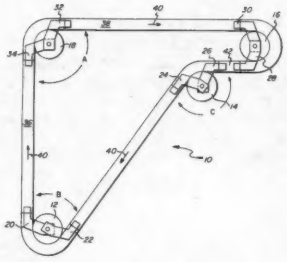
1. An unloading method for positioning a cable on a depository of a cable finishing system, characterized in the steps of: grasping a finished cable at a predetermined point on the cable, said point being determined by the location of a transfer device with respect to first and second conveyors for conveying said cable, pulling said cable over a depository, said depository having a surface with a discontinuity therein arranged in an axial direction of the cable for accommodating a loop in said cable, feeding a predetermined section of the cable into the discontinuity, and releasing the grasped cable point in a predetermiend position.

4,875,572
TRAY TRANSFER DEVICE
Masaharu Kiriake, Uji, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan
Filed Sep. 16, 1987, Ser. No. 97,449
Claims priority, application Japan, Sep. 20, 1986, 61-222544
Int. Cl.[4] B65G *25/08*
U.S. Cl. 198—744 19 Claims



1. A tray transfer device, comprising a sliding member provided along a feeding path for trays and is mounted for reciprocal movement by a distance equal to a predetermined pitch in the tray feeding direction, tray engaging members located on said sliding member by a pitch substantially equal to the predetermined pitch such that the trays may be pitch fed at a time by said engaging members, and tray abutting members spaced apart by a pitch substantially equal to the predetermined pitch and arranged to abut trays in the feeding path, each of said tray abutting members having a first abutting portion arranged to abut a tray and hinder movement of the tray in a first direction, each of said tray abutting members having a second abutting portion arranged to abut a tray and hinder movement of the tray in a second direction opposite to the first direction, wherein trays fed by said sliding member and tray engaging members are maintained at a pitch substantially equal to the predetermined pitch by the first and second abutting portions of said tray abutting members.

4,875,573
WHEEL TURN AND HANGER BRACKET ASSEMBLY THEREFOR
John A. Wiseman, Lynchburg, Va., assignor to Simplimatic Engineering Company, Lynchburg, Va.
Filed Jul. 11, 1988, Ser. No. 217,467
Int. Cl.[4] B65G *21/16*
U.S. Cl. 198—831 6 Claims

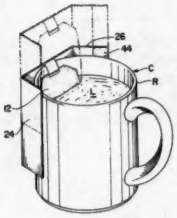


1. A wheel turn bracket assembly for an article conveying system for coupling inbound and outbound tracks of a moving surface conveyor to inbound and outbound sides respectively of a wheel turn at an angle between said tracks that can be adjustably selected depending upon the angle of the desired turn, said wheel turn including a wheel rotatable about an axle to guide at least a section of said moving surface through said turn along a turn centerline concentric with said wheel, said bracket assembly comprising a pair of substantially identical, L-shaped bracket members, each said bracket member having a first leg with a length approximately corresponding to the radius of said wheel and forming a bore therein adjacent one end of said first leg for receiving said axle, said bore being sized to mate with said axle in a rotatable relationship, each said bracket member further having a second leg formed at approximately a right angle to said first leg, said second leg having means for coupling to an end of one of said tracks, the first leg length being such that when said bore is positioned around said axle and said track end is coupled to said second leg, said track end is positioned adjacent said wheel in substantial alignment with the turn centerline at said point and the centerline of said track is aligned with the centerline of said turn, said pair of brackets being positionable with one bracket in a first orientation and the second bracket in a flipped orientation with said bores thereof aligned to fit around said axle and extend said second legs of said brackets outwardly on opposite sides of the turn to receive said inbound and outbound tracks in approximate alignment with the centerline of said turn, the bracket member pair being rotatably adjustable independent of each other around said axle to provide a selected angle between said inbound and outbound tracks.

4,875,574
INFUSION PACKAGE
Barbara E. Travers, 11 Meadow View Dr., Esmond, R.I. 02917
Filed Feb. 24, 1989, Ser. No. 315,089
Int. Cl.[4] B65D *29/04*
U.S. Cl. 206—0.5 9 Claims

1. An infusion package for a tea tag and the like, comprising an outer cover of flexible sheet, said sheet including a main central panel having opposed side and top and bottom edges and a pair of adjacent side panels having inner and outer edges hingedly attached by means of said side panel inner edges to said central panel along the side edges thereof, said panels each having inner and outer surfaces, a porous bag containing beverage infusion material hingedly attached at an upper portion thereof to said central panel for positioning against and gener-

ally within the planar extent of the inner surface of said central panel when said package is in a closed storage position, said side panels adapted to swing to a partial overlapping position with respect to each other with their respective inner surfaces superposed with respect to the central panel inner surface in said close position, and means for holding said package in said



closed position, said side panels adapted to swing outwardly from said central panel to an open use position wherein said package may be positioned on the outside surface of a cup with said infusion bag extending over the rim thereof and into said cup with at least portions of the inner surfaces of said side panels contacting the outer cup surface to support said package with respect thereto.

4,875,575

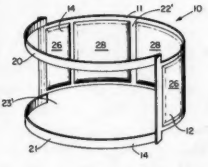
POUCHED LAUNDRY WASH ACTIVE DISPENSER FOR IMPROVED SOLUBILITY

Stephen W. Snyder; Craig C. Monsell; Russell R. Driver, and Carol S. Puckett, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 148,451, Jan. 26, 1988, abandoned. This application Aug. 26, 1988, Ser. No. 237,243

Int. Cl.[4] D06F *39/02*

U.S. Cl. 206—0.5 **6 Claims**



1. A disposable dispenser for dispensing a laundry active into an automatic central post agitator washing machine wash period water, said dispenser comprising:

A. at least one container pouch made with a water-permeable, water-insoluble substrate;

B. a soluble laundry active contained by said pouch; and

C. a fastening means integral with said pouch and forming at lest one loop to fasten said pouch to the automatic washing machine central post agitator;

whereby said pouch is restrained to an area near said central post agitator and in said wash period water for controlled release of said laundry active into said wash period water.

4,875,576

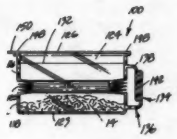
MIXING KIT

Lee A. Torgrimson, 9450 Singletree La., Missoula, Mont. 59803, and Louis M. Chinske, 2412 Glen Dr., Missoula, Mont. 59801

Filed Feb. 5, 1988, Ser. No. 152,898

Int. Cl.[4] B65D *25/08, 77/00*

U.S. Cl. 206—219 **8 Claims**



1. A mixing kit comprising:

a predetermined volume of a first mixture component, the first mixture component being substantially non-gaseous and adapted for combination with a second mixture component comprised of liquid in a predetermined mixture ratio: and

an enclosure retaining the volume of the first mixture component, the enclosure comprising:

a first portion, the first portion having an enclosure opening;

sealing means for covering the opening;

a second portion spaced from the first portion;

a third portion, the third portion being positioned between and joined to the first and second portions and expandable from a collapsed position to an expanded position;

the first, second and third portions defining a predetermined condensed enclosure volume which retains the volume of the first mixture component; and

The first, second and third portions defining a predetermined expanded enclosure mixture volume, the mixture volume being sufficient to retain the volume of the first mixture component plus a volume of the second mixture component in the predetermined ratio relative to the first mixture component; and

a fourth portion, the fourth portion being flexible and having one end connected to the exterior of the first portion and a second end connected to the exterior of the second portion, said fourth portion being expandable in response to the expansion of the third portion from a collapsed state to an expanded state in which the fourth portion in the expanded state forms a handle to enable a user to grasp the formed handle and support the mixing kit in the expanded positions to facilitate the mixture of the second mixture component with the first mixture component.

4,875,577

MULTICHAMBER CONTAINER

Bodo Hilderbrandt, Riedstadt, and Franz Steigerwald, Griesheim, both of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP87/00508, § 371 Date Apr. 14, 1988, § 102(e) Date Apr. 14, 1988, PCT Pub. No. WO88/01973, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 9, 1987, Ser. No. 208,299

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3631133

Int. Cl.[4] B65D *25/08*

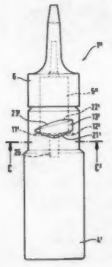
U.S. Cl. 206—219 **19 Claims**

1. In a multichamber container having no compressed gas therein and comprising an outer container and an inner container each containing a pourable substance wherein said substances are to be kept separate but to be extracted from said multichamber container as a mixture of said, said substances

being combined inside said multichamber container, the improvement comprising

(a) said outer container having an upper side; a rotatable cap; and a catch joint, said upper side of said outer container being connected to said rotatable cap with positive locking by said catch joint;

(b) said inner container having an open end at an upper side thereof, said cap having an inner side, said open end at said upper side of said inner container being connected to said inner side of said cap with positive locking and in a nonrotational and axially detachable manner;



(c) an outer wall of said inner container having two diametrically opposed projections, each of said projections having a radial, oblique plane on upper sides thereof; and

(d) an inner wall of said outer container having two diametrically opposed projections, each of said projections having a horizontally oriented plane on undersides thereof, said projections being formed in such a way that said projections come to communicate with one another by an axial turning of said cap to cause said inner container to be axially detachable from said cap; said cap being provided with a sealable extraction canal.

4,875,578

CONTAINER FOR RECORD CARRIERS

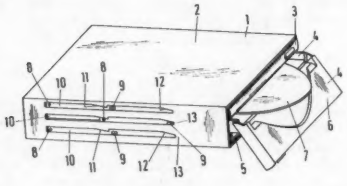
Wolfgang Nehl, Waldachtal/Tumlingen, Fed. Rep. of Germany, assignor to fischerwerke Artur Fischer GmbH & Co. KG, Waldachtal/Tumlingen, Fed. Rep. of Germany

Filed Aug. 17, 1988, Ser. No. 233,275

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1987, 3728113

Int. Cl.[4] B65D *85/57*

U.S. Cl. 206—309 **11 Claims**



1. A container for record carriers, such as magnetic band cassettes, sound or image plates, compact discs and the like, comprising a housing having lateral walls provided with longitudinal guides, said housing also having an open front end; at least one supporting element arranged in said housing; at least one slider arranged for receiving a record carrier and movable in said housing to a withdrawal position, said slider having lateral pins engaging in said longitudinal guides of said lateral walls of said housing, said longitudinal guides having at least one partial region provided an inclined guiding surface formed so that before reaching said withdrawal position a respective one of said pins slides along a respective one of said inclined guiding surfaces so as to press said slider against said supporting element.

4,875,579

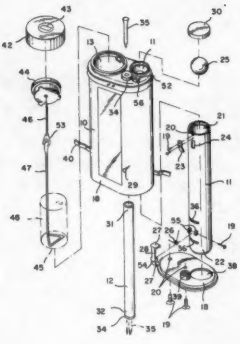
PORTABLE CONTAINER ASSEMBLY FOR CONTAINING GOLF ACCESSORIES

Seung W. Tak, 42 Auburn Rd., West Hartford, Conn. 06119

Filed Jul. 27, 1988, Ser. No. 224,676

Int. Cl.[4] A63B *57/00, 55/02*

U.S. Cl. 206—315.1 **11 Claims**



1. A portable container for accommodating golf accessories, which is capable of being attached to a golf bag which comprises:

a body member, said body member defining a first elongated chamber, a second elongated chamber, a third elongated chamber, and a fourth elongated chamber disposed therein,

a golf ball holding cylinder disposed in said first elongated chamber,

golf ball holding means operatively provided at a lower end of the golf ball holding cylinder for holding golf balls within the golf ball holding cylinder or selectively releasing the golf balls from said golf ball holding cylinder, one by one,

a golf tee holding cylinder disposed in said second elongated chamber, said golf tee holding cylinder being provided with a collar at each end thereof, said collars including means for holding and selectively removing golf tees from said golf tee holding cylinder, one by one,

a golf marking pencil holding cylinder disposed in said third elongated chamber, said golf marking pencil holding cylinder being provided with a collar cap at a top end thereof, said collar cap including means for gripping said golf marking pencil,

a drink can jar disposed in said fourth elongated chamber for holding drink cans, said drink can jar being provided with an outer cap and an inner cap connected to a rigid lifting member for lifting the drink cans, one by one,

a body member cap attached to said body member, said body member cap including large and small circular apertures for receiving said golf ball holding cylinder and said golf tee holding cylinder, respectively,

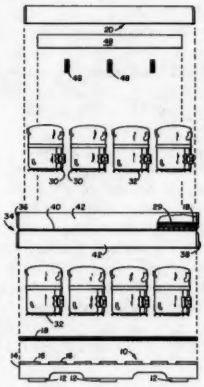
a digital watch disposed at a top of said outer cap, and

attaching means for attaching or detaching said portable container to said golf bag.

4,875,580
COMPRESSOR SHIPPING PACKAGE

Hugh C. Stringer, Bristol, and Larry D. Montgomery, Glade Spring, both of Va., assignors to Bristol Compressors, Inc., Bristol, Va.

Filed Feb. 21, 1989, Ser. No. 312,869
Int. Cl.[4] B65D 85/62, 81/02
U.S. Cl. 206—319 7 Claims

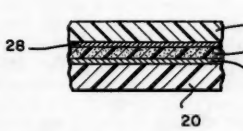


1. A shipping package for individual product units or the like, adapted for use with a substantially planar shipping pallet, said package comprising base pad means and at least one middle pad means, each of which pad means has a substantially planar corrugated board member having one or more upper and lower plies, at least one of said upper plies having a plurality of individual cut-outs opening at the top surface of said member, each cut-out being shaped to receive lower portions of an individual product unit in a substantially confining manner for preventing lateral movement thereof, each said middle pad means having strengthening wall means peripherally surrounding said board member and oriented normal to the plane thereof, said wall means extending a substantial distance on each side of said plane for maintaining the planar character of said member against substantial distortion forces, a plurality of units positioned on each said pad means in said cut-outs with each said middle pad means positioned on the tops of underlying units, and cap means overlying the uppermost plurality of product units.

4,875,581
STATIC DISSIPATIVE ELASTOMERIC COATING FOR ELECTRONIC PACKAGING COMPONENTS

Robert Ray, Auburn, Me.; Robert A. Neal, R.F.D. 1, Wales Rd., Sabattus, Me. 04280; John R. Jaran, Waterbury, and Tim Parker, Southbury, both of Conn., assignors to Robert B. Ray and Robert A. Neal, both of Green, Me.

Filed Mar. 19, 1985, Ser. No. 713,420
Int. Cl.[4] B61D 73/02
U.S. Cl. 206—328 4 Claims

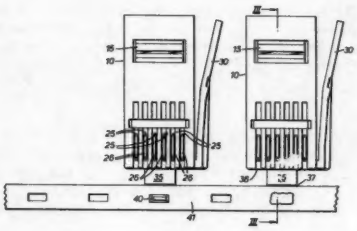


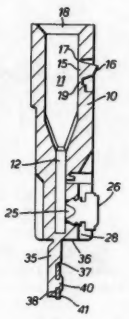
1. An outer surface, static dissipative transparent elastomeric coating which is applied over a conductive, transparent layer of an electronic packaging composite, characterized by being static dissipative with a surface resistivity in a range between 8 to 10 ohms per square.

4,875,582
CARRIER ASSEMBLY AND METHOD OF MANUFACTURING SAME

James E. Finney, Aldershot, United Kingdom, and Weldon L. Brubaker, Lisle, Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed May 25, 1984, Ser. No. 613,949
Claims priority, application United Kingdom, Jun. 3, 1983, 8315211
Int. Cl.[4] B65D 73/02
U.S. Cl. 206—330 5 Claims





1. A carrier assembly including a generally continuous carrier strip and a plurality of molded articles secured thereto, each article having a body and a tag integrally molded with the body extending outwardly therefrom secured to said strip, the improvement comprising:

said carrier strip being made of flexible material that is separate from said article and including a plurality of spaced apart holes formed therein; and

a projection integrally formed on said tag and received through a hole in an interengaging fashion;

whereby said carrier assembly is capable of being wound on a reel.

4,875,583
NEEDLE CAP REPLACEMENT DEVICE

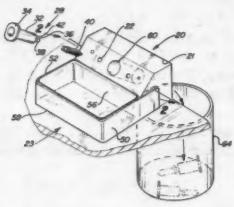
Jerry L. Nosanchuk, 31130 Sunset, Franklin, Mich. 48025

Filed Jun. 6, 1988, Ser. No. 202,396
Int. Cl.[4] B65D 83/10
U.S. Cl. 206—365 8 Claims

1. A needle cap replacement device for use during a medical procedure comprising:

a block having a top surface and a bottom surface, a back surface, opposed side surfaces, at least one frontal surface, having at least one rounded recess, wherein the recess has

a diameter and a depth for receipt and retention of a needle cap,



wherein at least one hole having a diameter large enough to receive a syringe and needle, is formed through to the exterior of the block, forming a disposal chamber for the syringe and needle.

4,875,584

CONTAINER FOR MAGNETIC TAPE CASSETTES

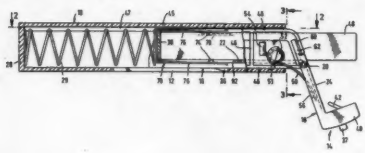
Peter Ackeret, Kusnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Chur, Switzerland

Filed Dec. 21, 1988, Ser. No. 287,874

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743481

Int. Cl.[4] B65D *85/672*

U.S. Cl. 206—387 **15 Claims**



1. A container for accomodation of magnetic tape cassettes which exhibit, on a large face thereof, two circular recesses of identical size, said recesses being offset with respect to a plane of symmetry by a distance less than the recess diameter, said container comprising a substantially brick-shaped housing which has an open narrow side, the container further comprising transporter means for displacing a cassette received in the housing from an inner storage position into an outer removal position in which a portion of said cassette extends beyond said open housing side by an amount sufficient to permit grasping of the cassette, wherein the container includes at least one arresting member adapted to engage, depending upon the insertion direction of the cassette, respectively into the one or the other of said recesses, said arresting member being deflectable in a direction transverse to said large face upon insertion or withdrawal of a cassette.

4,875,585

CARTON HAVING A HORIZONTAL OBJECT HOLDING PANEL AND BLANK

Richard G. Kadleck, Berea, and William W. Nowak, Broadview Heights, both of Ohio, assignors to The Shelby Paper Box Co., Westlake, Ohio

Continuation-in-part of Ser. No. 140,158, Dec. 31, 1987, abandoned, which is a division of Ser. No. 897,498, Aug. 18, 1986, Pat. No. 4,735,314. This application Mar. 10, 1988, Ser. No. 166,532

Int. Cl.[4] B65D *85/44, 5/06*

U.S. Cl. 206—426 **8 Claims**

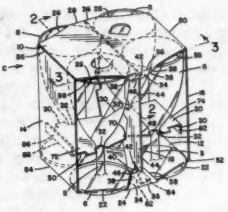
1. A folded carton for drinking glasses or similar objects formed from a sheet of paperboard material and comprising:

horizontal and vertical panels forming a sleeve having opposed open ends for insertion and removal of said objects, said horizontal panels forming a top and bottom of said sleeve and said vertical panels forming outer side walls of said sleeve;

a separator panel in said sleeve extending between said horizontal panels to define adjacent interior compartments; and

an object holding panel extending continuously, as a single piece formed from said paperboard material, between opposite ends connected to said outer side walls, having a horizontal portion extending through the plane of said separator panel, and being formed integrally with said separator panel along a horizontal line at which said object holding panel intersects the plane of said separator panel.

6. In a foldable blank for construction of a carton for drinking glasses or similar objects comprising a sheet having panel folding lines defining distinct planar panels pivotal with respect to one another about said panel folding lines, the improvement comprising: at least one of said panels having first and second ends and an internal folding line extending across a portion thereof; and an object holding panel having a first section defined by a first cut line extending on one side of said internal folding line and a second section defined by a pair of second cut lines extending on the other side of said internal folding line, said second cut lines extending from said internal



folding line to said second end, said second section of said object holding panel extending from said internal folding line between said second cut lines and beyond said second end, said object holding panel being rotatable out of the plane of said one panel about said internal folding line into a rotated position wherein said first and second sections extend from said internal folding line on opposite sides of said plane.

7. A foldable blank sheet for construction of a carton for drinking glasses or similar objects comprising:

an elongated sheet having laterally extending folding lines defining successive planar panels along the length of said sheet, said panels comprising, in longitudinal succession a top panel, a first side panel, a bottom panel, a second side panel, a bridging panel, a separator panel, and a glue flap;

said glue flap being interrupted in its width across said blank sheet by a pair of cut lines extending across said glue flap;

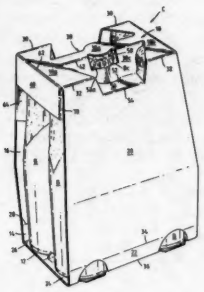
said separator panel including an internal folding line extending laterally across a portion thereof, and an object holding panel defined in part by a first section of said separator panel cut out on one side of said internal folding line and in part by a second section of said separator panel cut out on the other side of said internal folding line and extending longitudinally between said cut lines in said glue flap, said object holding panel being rotatable as a whole out of the plane of said separator panel about said internal folding line with said first and second sections thereby being disposed on opposite sides of said plane.

4,875,586

MULTIPACK WITH TOP PANEL KEEL

Jean Chanssadas, Brassioux, France, assignor to The Mead Corporation, Dayton, Ohio

Filed Mar. 6, 1989, Ser. No. 319,032
Int. Cl.[4] B65D 71/00
U.S. Cl. 206—427 **7 Claims**



1. A carton for accommodating a plurality of articles such as bottles arranged in a group including at least four bottles arranged in at least two parallel rows and a center bottle disposed intermediate said rows, said carton comprising:

a top panel, base panel means and spaced side wall panels interconnected and hinged to opposite side edges of said top panel and said base panel means; and

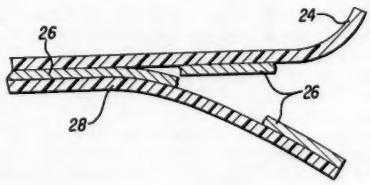
locking and separating means provided at least in part by said top panel and having portions thereof displaced out of the plane of said top panel, for holding said central bottle centrally of said group while maintaining the relative spacing of adjacent bottles in said group.

4,875,587

EASY OPEN SHRINKABLE LAMINATE

Cedric M. Lulham, Gray Court; George D. Wofford, Woodruff; John G. Bradfute, Greer, and Steven G. Friedrich, both of Greer, all of S.C., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation of Ser. No. 912,674, Sep. 25, 1986, Pat. No. 4,729,476, which is a continuation of Ser. No. 703,645, Feb. 21, 1985, abandoned. This application Mar. 3, 1988, Ser. No. 163,449
Int. Cl.[4] B65D 75/26
U.S. Cl. 206—484 **6 Claims**



1. An easy to open package comprising:

(a) first and second webs having an article positioned therebetween;

(b) each web having a self-welding sealant layer on one of its surfaces, said self-welding surfaces being adhered to each other around at least a portion of the periphery of said article;

(c) said sealant layers being further sealed to each other in a fusion seal around the article thereby enclosing said article;

(d) the bond between the sealant layer and the layer adjacent to it in the second web being weaker in the fusion seal area than the adhesion between the two sealant layers whereby when self-welded portions of the webs are peeled apart and the peeling action reaches the fusion seal area the sealant layer of the second web will tear out in the fusion seal area thus permitting access to the article.

6. A method of making an easy to open package comprising the steps:

(a) providing first and second webs having an article positioned therebetween with each web having a sealant layer on one of its surfaces; the sealant layer of the first web comprising a blend of ethylene/vinyl-acetate copolymer and an ionomer, and the sealing layer of the second web comprising an ionomer having a thickness between 0.2 and 0.3 mils;

(b) positioning the sealant layers of each web in fact-to-face relationship to each other with one web superimposed over the other so that the edges along a side of each web terminate approximately congruently thereby providing web edges along at least one side of the article which may be gripped and peeled apart;

(c) sealing said sealant layers to each other with heat and pressure to form a fusion seal, said seal being located between said one edge and the article, the bond between the sealant layer and the layer adjacent to it in the second web being weaker in the fusion seal area than the adhesion between the two sealant layers whereby when the webs are peeled apart the sealant layer of the second web will tear out in the fusion seal area thus permitting access to the article.

4,875,588

METHOD AND APPARATUS FOR UNLOADING SLIDE PROJECTOR TRAYS

Owen L. Lamb, Los Gatos, Calif., assignor to Slide Management Systems, Inc., Los Gatos, Calif.

Filed May 26, 1987, Ser. No. 54,383
Int. Cl.[4] B07C 5/00
U.S. Cl. 209—3.3 **20 Claims**

1. A slide tray unloader comprising:

a slide magazine, said magazine being constructed so as to hold slides therein in a stack, with one slide stacked upon another;

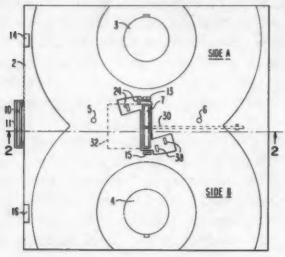
a slide gate;

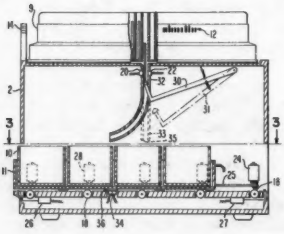
first means for holding said slide magazine below said slide gate;

second means for holding a tray having a plurality of compartments therein about said slide gate such that one of said compartments coincides with said slide gate;

means at said slide gate for transporting a slide from said selected one compartment of said tray such that said slide

is reorientated from said vertical position to a horizontal position to thereby drop said slide into said magazine; and,





means for advancing said tray to position a particular compartment to coincide with said slide gate.

4,875,589

MONITORING SYSTEM

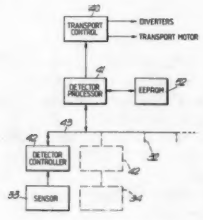
Paul D. Lacey, Portsmouth, and Anthony Martin, Fareham, both of England, assignors to De La Rue Systems, Ltd., England

Filed Feb. 23, 1988, Ser. No. 159,218

Claims priority, application United Kingdom, Feb. 24, 1987, 8704269

Int. Cl.[4] B07C *5/342*; G06K *9/82*

U.S. Cl. 209—534 **13 Claims**



10. Apparatus for storing articles, the apparatus comprising:

a transport system;

a diverter assembly to which articles are conveyed by said transport system;

an article monitoring system for monitoring at least one characteristic of articles fed by said transport system towards said diverter assembly, said article monitoring system including:

a plurality of sensor assemblies, each sensor assembly including a sensor for sensing a respective characteristic of an article and for generating a corresponding first signal; and

processing means for applying respective predetermined alogorithms to each said first signal to generate respective values therefrom, for comparing said respective values with respective predetermined thresholds to generate second, binary signals indicating the relationship of each values with said corresponding threshold, and for comparing said second signals with a set of predetermined second signals corresponding to a known type of article to generate a third signal indicating the relationship between the second signals and the set of predetermined second signals; and

said apparatus further including control means to causes said diverter assembly guide articles in a direction selected in accordance with said third signal from said processing means.

4,875,590

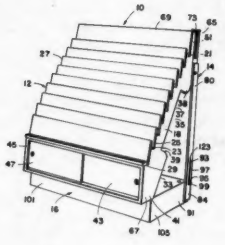
FOLDABLE DISPLAY

Gregory G. Martin, East Jordan, and Thomas J. Nook, Grand Haven, both of Mich., assignors to Harbor Industries, Grand Haven, Mich.

Filed Nov. 9, 1987, Ser. No. 118,859

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—55 **9 Claims**



1. A collapsible display assembly which is adjustable between an open display position and a flat storage position, wherein said assembly comprises:

a rack member adapted to support items for display thereon in said display position, said rack member having an upper end, a lower end and a side extending between said ends;

at least one leg having first and second opposite ends, said first end being pivotally connected to said rack member adjacent the upper end thereof;

a base having a forward edge and a rearward edge, said base being pivotally connected to said second end of said leg at said rearward edge and means for adjustably positioning said rearward edge along said leg such that said base underlies and supports said rack member and said leg in said open display position with said lower end of said rack member resting on said base adjacent said forward edge, and wherein said base is received between said rack member and said leg in said flat storage position; and

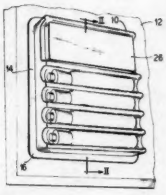
releasable latch means for coupling said base and said rack member in said display position and which permits said rack member and said base to be manually detached without the use of tools when in said flat storage position.

4,875,591

MARKING BOARD IMPLEMENT HOLDER

Jerome J. Mikesell, Chicago, Ill., assignor to M. Manufacturing Services, Inc., Chicago, Ill.

Continuation of Ser. No. 939,180, Dec. 8, 1986, abandoned. This application Aug. 31, 1988, Ser. No. 238,992
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—69.1 1 Claim



1. A holder for releasably holding first and a plurality of second marking board implements each of which has a length and predetermined cross-sectional dimensions, comprising:

a one-piece molded plastic structure including a planar rectangular peripheral flange;

adhesive strips affixed to said flange for mounting said holder to a support;

peel-off strips on and protecting said adhesive strips;

an outer wall extending a predetermined distance from and perpendicular to the plane of said peripheral flange, said outer wall comprising first and second parallel, spaced outer wall sections and third and fourth parallel spaced outer wall sections perpendicular to said first and second outer wall sections;

an inner wall extending between and connected to said first, second, third and fourth outer wall sections;

said inner wall comprising first, second and third inner wall sections extending parallel to said first outer wall section, said third inner wall section connecting said first and second inner wall sections and together therewith forming a first cavity for receiving the first marking board implement, said first and second inner wall sections extending convergent towards one another in the direction of said third inner wall section to provide a snug fit for the first marking board implement and dimensioned to prevent easy removal of the first marking board implement;

a plurality of fourth inner wall sections, extending parallel to one another and serially connected together between said second inner wall section and said second outer wall section, each of said fourth inner wall sections forming a cavity for receiving a respective second marking board implement and being substantially of U-shaped cross-section and including resilient portions spaced less than the predetermined cross-sectional dimensions of the second marking board implements for yieldable bypassing of the rspective second marking board implement, said fourth inner wall sections being dimensioned to provide depths for each of the cavities which together with said resilient portions prevents easy removal of a respective second marking board implement; and

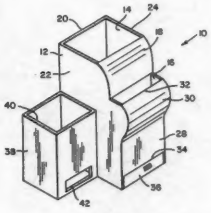
end portions connecting said third and fourth outer wall portions to said inner wall at locations adjacent the marking board cavities and at distances less than said predetermined distance from said peripheral flange to provide access to and easy removal of the marking board implement and wherein said pressure relief means comprises: at least one hole through said third wall section.

4,875,592

DRYING RACK AND RECEPTACLE FOR TOWELS AND WASH CLOTHS

George W. Waller, Rte. 13, 190 Strickland Rd., Alpharetta, Ga. 30201

Filed Oct. 18, 1988, Ser. No. 259,335
Int. Cl.[4] A47F 5/08
U.S. Cl. 211—88 16 Claims



1. A drying rack for wet cloths such as towels and wash cloths, said rack comprising:

(a) a first enclosure having a front wall, a rear wall, and a pair of opposed side walls, said enclosure including a pair of axially spaced, substantially horizontally disposed enclosure openings;

(b) a convexly curved, generally upwardly facing drying surface positioned between the openings of the enclosure for supporting a wet cloth for drying said curved drying surface extending between said side walls with the lateral edges of said drying surface being coextensive with the adjacent edges of said side walls, said drying surface further defining a portion of the front wall of said enclosure between said openings, thereby providing a relatively large area for said surface; and

(c) water collection means positioned below the drying surface for catching and collecting water that drips from wet cloths lying on the drying surface, said water collection means being in the form of a drip container that is below said openings and is laterally slidably movable relative to said enclosure.

4,875,593

HANGING SHOWER CADDY

Larry J. Trimble, 1625 S. Main St., St. Martinville, La. 70582

Filed Feb. 26, 1988, Ser. No. 161,147
Int. Cl.[4] A47F 5/08
U.S. Cl. 211—95 7 Claims

1. A side wall mounted shower caddy apparatus for holding bath articles such as soap, razors and the like comprising:

a. a top cap;

b. a mid-section cabinet for holding bath articles;

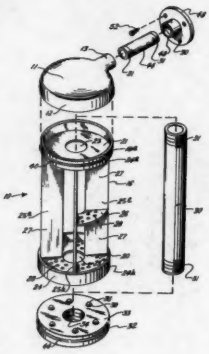
c. a bottom cap;

d. means connecting to the top cap and defining the sole supporting member for securing the cabinet to a side wall so that bath articles carried by the cabinet do not fall upon the bather;

e. means for rotating the mid-section cabinet with respect to the top and bottom caps so that bath articles may be conveniently selected from the cabinet;

f. means for connecting the top cap, mid-section cabinet and bottom cap together in substantially vertical alignment, wherein there is a central bore in the top cap, mid-section cabinet and bottom cap through which extends a vertical rod which is rigidly secured to the top cap and the bottom cap, and a vertical, downwardly extending rim on the top cap provides an annular groove extending around the circumference of the interior surface of the rim, and the mid-section cabinet includes upper and lower opposing plates bound circumferentially by a pair of retainer rings, including an upper retainer ring having a tongue around

an exterior surface for mating with the annular groove of the interior surface of the rim of the cap, the retainer ring of the lower plate having an annular groove extending



around the circumference of its interior surface, and the bottom cap having a tongue around its exterior surface for mating with the annular groove of the interior surface of the retainer ring of the lower plate.

4,875,594

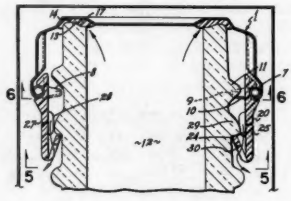
CLOSURE CAP

Charles S. Ochs, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Dec. 16, 1988, Ser. No. 285,651

Int. Cl.[4] B65D *41/48*

U.S. Cl. 215—252 **18 Claims**



1. In a clousre cap for sealing a container and having a metal shell with a cover and a depending skirt with a plurality of circumferentially spaced lugs projecting inwardly therefrom for engaging fastening means on a container the improvement which comprises a plastic insert band attached to and extending downwardly from said skirt having a tamper indicating portion defined by a line of weakness comprising container engaging locking means extending inwardly and upwardly from its lower edge.

4,875,595

STORAGE ENCLOSURE

N. L. Van Valkenburg, 624 Maulhardt Ave., Oxnard, Calif. 93030

Filed Jul. 11, 1988, Ser. No. 217,399

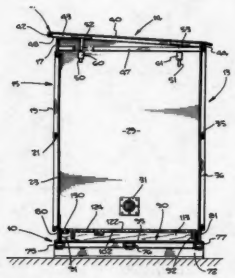
Int. Cl.[4] B65D *81/00*

U.S. Cl. 220—1.5 **13 Claims**

7. A storage enclosure for storing containers of hazardous material and providing for a secondary containment of any spills or leakage of materials from said containers, said enclosure having a base, a containment pan, side and rear walls, a front wall having at least one front door and a roof, wherein:

said base includes a plurality of support beams providing a plurality of spaced support upper surfaces and a plurality of side beams providing a plurality of side surfaces extending vertically upwardly of said support surfaces, said support surfaces and side surfaces together providing a support framework for receiving and supporting said containment pan whereby portions of the pan are visible through spaces between said support surfaces;

said side and rear walls are each fabrications of tubular steel wall frames each having a single sheet steel wall panel secured thereto;



said roof is a fabrication of a tubular steel roof frame and a single sheet root panel; wherein

said roof panel rests upon upper portions of said side frames;

a plurality of retention posts are provided on said roof frame, each such post depending therefrom; and

a plurality of apertured blocks are provided on said wall panels and aligned individually to and receiving individual ones of said posts in a friction fit connection whereby said roof panel can separate upwardly of said side frames when internal pressure within said enclosure over comes said friction fit of said posts and apertured blocks.

4,875,596

FLEXIBLE VESSEL

Jürgen Lohse, Norderstedter Str. 88 A, D-2359 Henstedt-Ulzburg, Fed. Rep. of Germany

PCT No. PCT/EP87/00400, § 371 Date Mar. 22, 1988, § 102(e) Date Mar. 22, 1988, PCT Pub. No. WO88/00913, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 22, 1987, Ser. No. 177,546

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1986, 3625224

Int. Cl.[4] B65D *88/16*

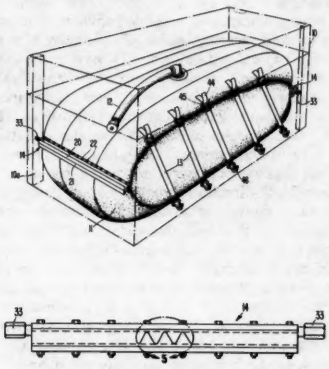
U.S. Cl. 220—403 **21 Claims**

1. Apparatus for holding goods comprising:

a flexible vessel comprising a tube having two tube ends and adapted to receive the goods, the vessel having at least one opening for filling and discharging the goods, the vessel being made of one of an elastomeric material and a thermoplastic material; and

a clamp attached to each of said tube ends, each clamp defining a length, at least one of the clamps having an

extension part movable with respect to the rest of the clamp to extend the length of the clamp, said clamp having the extension part being adapted for attachment under compression between parts of a container.

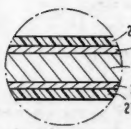


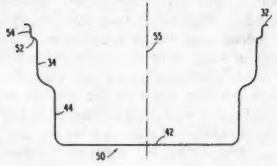
4,875,597

CONVENIENCE PACKAGING

William T. Saunders, Weirton, W. Va., assignor to Weirton Steel Corporation, Weirton, W. Va.

Filed Dec. 2, 1988, Ser. No. 279,403
Int. Cl.[4] B65D *1/14, 25/34*
U.S. Cl. 220—458 20 Claims





1. A one-piece rigid sheet metal substrate can body for shipping and storing comestibles which can be safely used for heating such contents in a microwave oven and which is suitable for serving and consuming such contents directly therefrom,

such can body being shaped solely by draw processing from flat rolled sheet metal substrate precoated with organic coating and draw lubricant on both its planar surfaces, and consisting of

a closed bottom wall,

a unitary sidewall, and

a unitary transition zone interconnecting such bottom wall and sidewall,

each coated with organic coating on interior and exterior surfaces thereof,

such sidewall defining

an open end for such can body which is oppositely disposed in relation to such bottom wall along a centrally located axis which is perpendicular to the plane of such bottom wall and open end,

such sidewall being symmetrically disposed in relation to such axis,

such sidewall including

at least three sidewall portions defining differing cross-sectional areas as projected onto a plane which is perpendicularly transverse to such axis than a similar projection of such closed bottom wall, with

the sidewall portion defining the largest cross-sectional area being contiguous to such open end of the can body, and, with

sidewall portions defining progressively smaller cross-sectional areas being disposed toward such closed bottom wall of the can body such that the sidewall portion defining the smallest cross-sectional area is interconnected to such bottom wall by such transition zone,

such transition zone when projected onto a plane which is perpendicularly transverse to the centrally located axis defines an area which is at least about 20% of the cross-sectional area of a similar projection of the cross-sectional area of such sidewall portion which is interconnected with such bottom wall,

such sidewall portions defining differing cross-sectional areas being joined to adjacent portions of the one-piece can body by transition zones which are curvilinear in cross-sectional configuration as projected onto a longitudinal cross-sectional plane which includes such centrally located axis, and, in which

such open end cross-sectional area extends to about 40% larger than such closed bottom wall cross-sectional area, and

the minimum cross-sectional dimension measured in a lateral plane which is perpendicularly transverse to such central axis at such open end is at least about four inches.

4. An integral package comprising

(A) a one-piece rigid sheet metal substrate can body having a closed bottom wall,

a unitary sidewall defining an open end for such can body, and

a unitary transition zone interconnecting such bottom wall and sidewall;

such can body being shaped entirely by draw processing of flat rolled sheet metal substrate precoated in flat rolled form on both its surfaces with organic coating and draw lubricant,

such can body presenting such organic coating on both interior and exterior surfaces thereof,

such sidewall being symmetrically disposed about a centrally located axis which extends in perpendicular relationship to the plane of such bottom wall and such open end,

a transition zone being curvilinear in a heightwise-oriented cross-sectional plane which includes such centrally located axis,

such sidewall including at least three sidewall portions defining different cross-sectional areas than such bottom wall, with

the sidewall portion defining the largest cross-sectional area being contiguous to such open end of the can body, with

remaining sidewall portions defining smaller cross-sectional areas being disposed with such progressively smaller cross-sectional areas extending toward such closed bottom wall,

with no interior sidewall portion of the can body defining a larger cross-sectional area than such larger cross-sectional area portion located at such open end of the can body; and, in which

such sidewall portions defining differing cross-sectional

areas being joined to adjacent portions of the one-piece can body by transition zones which are curvilinear as projected onto a cross-sectional plane which includes such centrally located axis;

(B) a non-unitary end closure for sealing such open end of the can body, and

(C) means joining sheet metal substrate at such open end of the can body to such end closure to seal such open end of the can body.

19. Method for fabricating a rigid sheet metal substrate can body for a convenience package providing for shipment and storage of comestibles without freezing, heating of such contents by microwave after opening, and serving and/or eating of heated comestibles directly from such can body comprising

providing a rigid sheet metal substrate selected from the group consisting of flat-rolled steel of about 55 to about 110#/bb and flat-rolled aluminum of a thickness gage between about 0.007" and about 0.012",

forming a one-piece can body from such metal substrate entirely by draw processing,

such can body being symmetrically disposed about

a central longitudinal axis,

such can body having a sidewall defining an open end at one axial end of the can body for introducing or removing comestibles,

a closed bottom wall at the remaining axial end of the can body,

a unitary, curvilinear, transition zone interconnecting such sidewall and closed bottomwall,

such sidewall including at least three portions which define differing lateral cross-sectional areas as measured in a plane which is perpendicularly transverse to such central axis, with

the portion defining the larger cross-sectional area being formed during a final redraw operation and located contiguous to such open end of the can body,

the portion defining the smallest cross-sectional area during a first redraw operation and interconnected with such closed bottom wall of the can body, and with

all such sidewall portions being interconnected at each respective longitudinal end with a next adjacent sidewall portion of the can body by a unitary interconnecting, curvilinear-cross section transition zone of diminishing cross-sectional area in approaching such bottom-wall, and

with the interior sidewall portions of the can body defining progressively smaller cross-sectional areas in moving from such open end of the can body to such bottom wall.

4,875,598

VENDING MACHINE FOR VENDING ONE-AT-A-TIME MERCHANDISE ARTICLES OF A PLURALITY OF SIMILAR SUCH MERCHANDISE OBJECTS, EACH OF A SUBSTANTIALLY RECTANGULAR PARALLELOPIPED SHAPE, SUCH AS A NEWSPAPER, MAGAZINE, OR THE LIKE

Frank L. Dahl, 5248 W. 119th Pl., Inglewood, Calif. 90304

Continuation-in-part of Ser. No. 906,134, Sep. 11, 1986, Pat. No. 4,756,448. This application Jul. 5, 1988, Ser. No. 215,045

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.[4] G07F *11/14*

U.S. Cl. 221—4 **19 Claims**

1. A novel vending machine for sequentially and selectively dispensing and vending each one of a plurality of substantially similarly shaped, flat, merchandise objects in an object-size-adjustable manner, comprising: a hollow housing defining therein an enclosure having a predetermined length dimension, a predetermined transversely perpendicular width dimension and a predetermined depth dimension perpendicular to both said length dimension and said width dimension, whereby to cause said enclosure to include a merchandise-storage portion of substantially parallelpiped shape and of a selected length, width, and depth such as to be large enough for interior storage of a plurality of depth-direction stacked similar merchandise objects, each of a similar substantially flat configuration, each having a predetermined length and width substantially less than the corresponding length and width dimension of said hollow enclosure, and each having a depth and thickness dimension which is only a small fraction of the depth dimension of said hollow enclosure, thereby providing for the depth-direction stacked superimposition of a plurality of such similar merchandise objects within said enclosure in depth-direction stacked relationship with the length and width dimension of each such merchandise object lying in a transverse plane; a transverse substantially flat supporting platform or table cooperable to receive said plurality of similar depth-direction stacked transversely oriented merchandise objects thereon within said hollow enclosure and being provided with an opposite-to-depth-direction directed biasing spring means cooperable with said transverse supporting platform or table and also cooperable with a fixed connection point thereof relative to the interior of said housing means for normally forcing said stacked plurality of similar merchandise objects in the biased opposite-to-depth direction substantially perpendicular to the transverse orientation of each of said merchandise objects; controllably adjustable stop means positioned in a manner spaced from said supporting platform or table and with an adjustable spaced relationship therebetween in an opposite-to-said depth direction manner such as to allow a desired number of stacked merchandise objects to be positioned between said supporting platform or table and said spaced stop means; separator means positioned within said hollow enclosure and transversely adjacent to a merchandise-dispensing region defined

between said supporting platform or table and said spaced stop means whereby to be immediately transversely adjacent to such a stacked assembly of said merchandise objects and displaced in said depth direction by a distance corresponding to the depth and thickness dimension of one of such merchandise objects and controllably manually extendsible from a normal at-rest position into a manually caused activation position with said separator means being forced between an end one only of such a plurality of stacked merchandise objects whereby to cause san end one of said merchandise objects to be effectively segregated from the remainder of the stacked merchandise objects to the end one of said merchandise object is in a condition to be manually removed from the hollow enclosure; said separator means comprising a transversely substantially flat separator knife-blade lying in a transverse plane parallel to a similar plane of stacking substantially coincident with a merchandise-object-supporting upper surface of said supporting platform or table, and having an effectively pointed substantially spear-shaped knife-blade leading edge as seen in plan view adjacent to, effectively facing, and directed toward said merchandise-storage portion of said enclosure for direction toward a plurality of depth-direction stacked similar merchandise objects adapted to be so-positioned therein; a manually openable access door carried by said housing means and provided with controllably openable locking means normally locking said access door in closed relationship with respect to said housing means; and merchandise object anti-drag means for effectively counteracting and neutralizing any tendency for translator movement of said separator knife blade of said sepa-

rator means to apply a corresponding frictional translatory dragging movement to the upper surface of a merchandise object immediately below a top merchandise object being vended and just below said separator knife blade of said separator means.

4,875,599

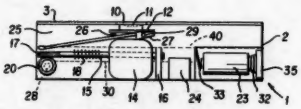
CARD CASE WITH POWERED DISPENSER

John E. Tuttle, 3605 Artic Blvd. No. 167, Anchorage, Ak. 99503, and Sheldon M. Ewing, P.O. Box 870187, Wasilla, Ak. 99687

Filed Jun. 14, 1988, Ser. No. 206,438

Int. Cl.[4] B65G *59/00;* **B65H** *1/08, 3/00;* **G07F** *11/16*

U.S. Cl. 221—231 **10 Claims**



1. A motorized card case for dispensing business cards and the like comprising:

(a) a lower case having a front, said front having a dispensing slot, a bottom, a grate, fixedly attached within said lower case, above said bottom, said grate forming a lower card platform on which a stack of cards are placed, four sides, and having an open top;

(b) a lid, hingably attached to the top of said lower case;

(c) motor means installed within said lower case;

(d) drive means connected to said motor means such that said drive means are positioned within said case to propel a card from said lower case through said dispensing slot and out of said device;

(e) actuating means, fixedly installed within said lower case, to engage said motor means;

(f) power supply means, fixedly installed within said lower case, to power said motor means; and

(g) a pressure ball hingably mounted in said lower case to retrain the stack of cards.

4,875,600

DEVICE FOR DOSING AND DISPENSING A FLUID PRODUCT TO BE DEPOSITED FREELY IN THE MOBILE ENCLOSURE OF A MACHINE

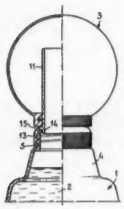
Martial D'Hoogue, Vitrolles; Claude Perrette, Reims, and Pierre Goffinet, Marseille Cedex, all of France, assignors to Union Generale De Savonnerie, Marseille, France

Filed Mar. 3, 1988, Ser. No. 163,624

Claims priority, application France, Mar. 4, 1987, 87 02942

Int. Cl.[4] B65B *3/04*

U.S. Cl. 222—52 **24 Claims**



1. In a device for receiving a predetermined dose of a fluid and for subsequently dispensing said dose when said device is tossed about, for example, within the tub of a washing machine, said device comprising:

a hollow receiving housing open at one end;

a hollow substantially tubular shaped member, at least an intermediate portion of said tubular member extending into said receiving housing and being surrounded by and secured to the open end of said receiving housing;

one end of said hollow tubular member extending into said receiving housing and lying a spaced distance inward from the closed end of said receiving housing opposite the open end of said housing;

the opposite free end of said tubular member extending beyond the opening in said receiving housing being adapted to be releasably secured to the dispensing opening of a container containing a fluid whereby, when said dispensing container is turned upside down, the free end of the tubular member extending into said receiving housing substantially determines the level of the liquid dispensed into said receiving housing and whereby when said receiving housing is turned substantially 180° from the liquid dose receiving position, the predetermined dispensed dose of liquid is contained within a hollow annular region defined by the interior surface of said receiving housing adjacent the open end of said receiving housing and the external surface of said hollow tubular member extending into said receiving housing.

4,875,601

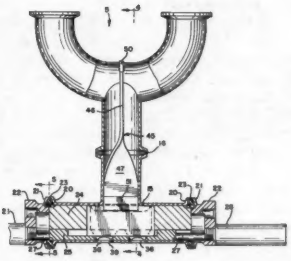
NOZZLE FOR DISPENSING INCREMENTS OF FLOWABLE PRODUCT

Gary F. Roberts, Colona, Ill., and Rick A. Meeker, Davenport, Iowa, assignors to The Kartridg Pak Co., Davenport, Iowa

Filed Aug. 1, 1988, Ser. No. 226,615

Int. Cl.[4] P67D *5/60, 5/06*

U.S. Cl. 222—145 **13 Claims**



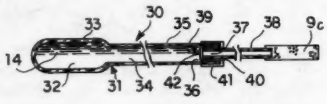
1. A nozzle for dispensing predetermined increments of a flowable mixture of solids in a fluid comprising, a nozzle body in the form of an inverted tee pipe fitting having at least one nozzle-outlet opening in its underside and located inwardly from the ends of the horizontal leg, a stationary plug occupying the upper-half and also a portion of the bottom-half of the interior of said horizontal leg, a slide occupying this remaining space in said interior bottom-half not occupied by said plug and shuttleable between an "open" position and a "close" position and having a slide-discharge opening therein for and which registers with each one of said nozzle-outlet openings when said slide is in its said "open" position, and said slide closing each said nozzle-outlet opening when in its said "close" position, and means operatively connected with said slide for shuttling it between its said "open" and "close" positions, and said plug having an elongated vertical opening therethrough overlying and registering with said one or more nozzle-outlet openings and said one or more slide-discharge openings when said slide is in its said "open" position.

4,875,602

SELF-CONTAINED LIQUID DISPENSING DEVICE

Robert Chickering, Corona Del Mar, Calif., and William A. Barabino, North Reading, Mass., assignors to Triad Direct Incorporated, Placentia, Calif.

Filed Jun. 15, 1988, Ser. No. 206,726
Int. Cl.[4] B65D 37/00
U.S. Cl. 222—187 10 Claims



1. A liquid dispensing device comprising;

a squeezable elongated cylindrical bulb adapted to be compressed between two fingers of a user and provided with a cavity adapted to contain a liquid desired to be dispensed,

said bulb having an axial extent defining a length substantially greater than the diameter of said bulb,

an elongated bulb shaft having a forward end and an axial bore therethrough communicating with said bulb cavity,

said bulb shaft defining an axial extent having a length no less than that of said bulb axial extent with said bulb shaft bore defining a diameter substantially less than that of said bulb cavity,

an elongated tip shaft having rearward and forward ends and provided with a central bore,

said bulb shaft and tip shaft each having a substantially constant configuration throughout their respective lengths,

an applicator tip supported upon said tip shaft forward end,

said tip comprising a disparate form adapted to receive and retain liquid for direct transfer to another member,

said bulb shaft and tip shaft of differing diameters and concentrically joined to one another,

normally fluid-tight means intermediate said bulb cavity and said tip shaft rearward end, said fluid-tight means including a rupturable closure-seal member initially transversely spanning said bulb shaft bore and isolating liquid within said bulb from said tip shaft bore, said closure-seal member including an integral flange sealingly joining an end of said bulb shaft to said tip shaft rearward end whereby,

upon squeezing of said bulb by a user's fingers, pressure is applied to liquid within said bulb cavity, causing a rupture of said closure-seal member and advancement of the liquid within said bulb cavity through said bulb shaft bore and said tip shaft bore and thence to said applicator tip.

4,875,603

METERED DISPENSING CAP FOR TUBES

Jack Weinstein, Manchester Township, Ocean County, N.J., assignor to Primary Delivery Systems, Inc., Annandale, N.J.

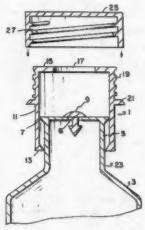
Filed Jan. 26, 1989, Ser. No. 302,339
Int. Cl.[4] B67D 5/06
U.S. Cl. 222—205 19 Claims

1. A metered dispensing cap system for containers, which comprises:

(a) a base element attachable to the neck of a squeezeable container having a sidewall portion and a top, and having an opening in said top for outflow of a material from a squeezeable container into a meter element;

(b) a one-way valve located in said opening of said base element, permitting flow of material from a squeezeable container through said opening and preventing backflow of material back into said container;

(c) a meter element having a sidewall portion and a top, and having an opening in said top for dispensing of material from said meter element, wherein the sidewall portion is slightly larger than and has the same cross-sectional shape as the sidewall portion of said base element, wherein said sidewall portion of said meter element is higher than and located about and encompasses the sidewall portion of said base, and wherein said meter element is vertically slidable along the sidewall portion of said base element, with an upward position whereby the meter element has a predetermined volume for receiving material from the opening at the top of said base element upon squeezing a squeezeable container and a downward position whereby the top of the meter element becomes biased toward the top of the base element so as to dispense a metered amount of material through the opening at the top of said meter element; and



(d) means for closing and opening the opening in the top of said metered element.

4,875,604

DISPENSER FOR PASTE-LIKE PRODUCTS

Joachim Czech, Jahnstrasse 19, D-8402 Donaustauf, Fed. Rep. of Germany

Continuation of Ser. No. 2,800, Jan. 13, 1987, abandoned. This application Oct. 3, 1988, Ser. No. 253,956
Claims priority, application Fed. Rep. of Germany, Jan. 17, 1986, 3601311
Int. Cl.[4] G01F 11/00
U.S. Cl. 222—257 19 Claims

1. A dispenser for paste-like products comprising a cylindrical container for storing a supply of paste-like products to be dispensed, said cylindrical container including a bottom portion having a slidable follower piston and upper portion having a dispensing means for dispensing the paste-like product, said dispensing means comprising:

(a) a first non-return valve (16) provided in an upper partition wall of the cylindrical container for controlling communication between the interior of the container and a pump chamber through a first opening (12) formed in said partition wall (11);

(b) a guide sleeve arrangement (6) surrounding said first opening (12) and having first non-return valve (16) hingedly connected thereto, said guide sleeve arrangement extending upwardly from said partition wall to define circumferentially said pump chamber (24), said guide sleeve arrangement (6) having inner and outer circumfer-

ential guide sleeves, said first non-return valve being hingedly connected to said inner guide sleeve;

(c) a cup-shaped actuator cap (7) having a peripheral downwardly projecting outer wall portion and an inner tubular section (19), the latter forming a discharge channel having a laterally outwardly opening outlet passage, wherein:

(1) said outer wall portion of the actuator cap (7) is slidably engaged with the outer circumferential guide sleeve of the guide sleeve arrangement (6), both being provided with co-operating stop projections (26, 27) to limit axial upward movement of the actuator cap (7),

(2) said outer guide sleeve being integral with said upper partition wall of said container, and providing an upper radially outwardly projecting rim portion (25) spaced from the stop projection (26) of the guide sleeve arrangement (6) to establish a circumferential guide surface engaging an inner cylindrical guide surface of the outer wall portion of the actuator cap,

(3) said tubular section of the actuator cap having a downwardly extending portion having a diameter greater than that of said laterally opening outlet passage and supporting a dispensing piston (22) to keep the piston (22) slidably engaged with said inner circumferential guide sleeve of said guide sleeve arrangement (6), thereby defining a space forming the pump chamber (24),

(4) said dispensing piston (22) having a second opening (29) in register with the tubular section of the actuator cap (7),

(5) said second opening (29) being controlled by a second non-return valve means (3) for controlling communication between the pump chamber upstream thereof and the discharge channel of the actuator cap downstream thereof; and

(d) a return spring (32) extending between a stationary portion of the inner guide sleeve and the actuator cap (7) to bias said actuator cap (7) into a rest position.

4,875,605

PRESSURIZED METERING DISPENSER

Terence E. Weston, Woodbridge, United Kingdom, assignor to Microvol Limited, Ipswich, England

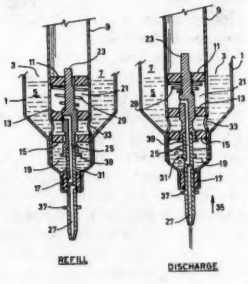
PCT No. PCT/GB87/00909, § 371 Date Jul. 26, 1988, § 102(e) Date Jul. 26, 1988, PCT Pub. No. WO88/04638, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 16, 1987, Ser. No. 224,949

Claims priority, application United Kingdom, Dec. 17, 1986, 8630100; Mar. 6, 1987, 8704639

Int. Cl.[4] B65D *83/00*

U.S. Cl. 222—402.24 **9 Claims**



1. A pressurised metering dispenser comprising a main reservoir, a liquid metering chamber and a gas holding chamber, arranged so that if the main reservoir is charged with a liquid and a pressurising gas and the dispenser is held in its position of use, the liquid metering chamber will normally be sealed from the environment and be in communication with the main reservoir to receive liquid therefrom and the gas holding chamber will normally be in communication with the main reservoir to receive gas therefrom, and during actuation of the dispenser the liquid metering chamber and the gas holding chamber pass through an intermediate state in which the liquid metering chamber is sealed from the external environment and from the main reservoir and the gas holding chamber is sealed from the main reservoir, and a final state in which the liquid metering chamber is open to the environment and the two chambers are in communication with each other but each sealed from the main reservoir.

4,875,606

REFRACTORY VALVE BODY AND SLIDING CLOSURE UNIT INCORPORATING THE SAME

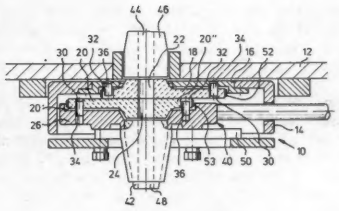
Werner Keller, Steinhausen, Switzerland, assignor to Stopinc Aktiengesellschaft, Baar, Switzerland

Filed Mar. 28, 1985, Ser. No. 717,295

Claims priority, application Switzerland, Apr. 13, 1984, 1858/84

Int. Cl.[4] B67D *3/00*; B22D *41/08*

U.S. Cl. 222—600 **39 Claims**



22. A refractory valve body for use as a stationary or as a sliding valve mamber of a sliding closure unit for controlling the discharge of molten material from a vessel, said valve body comprising:

a discharge opening for use in discharging molten material;

at least one elongated groove; and

at least one bore hole centered on a longitudinal axis of said groove extending in the direction of elongation thereof, said hole being separate from and not connected to said groove.

4,875,607

AUTOMATIC DETERGENT DISPENSER APPARATUS HAVING SYNCHRONOUS MOTOR DRIVE

Fumio Torita, Nagoya; Naotaka Ikeda, Yokohama; Kimihiko Nakamura, Seto; Katsuharu Matsuo, Nishikasugai; Tomio Hotta, Kuwana, and Yoshiyuki Makino, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 2, 1987, Ser. No. 127,960

Claims priority, application Japan, Mar. 14, 1987, 62-59694

Int. Cl.[4] B67D *5/06*; G01F *11/00*

U.S. Cl. 222—643 **8 Claims**

1. An automatic detergent dispenser apparatus comprising:

cleanser feeding means, having a cleanser housing portion for storing a cleanser therein, a cleanser feeding member for feeding said cleanser stored in said cleanser housing portion, and a synchronous motor for driving said cleanser feeding member for feeding an amount of cleanser corresponding to a number of revolutions of said synchronous motor;

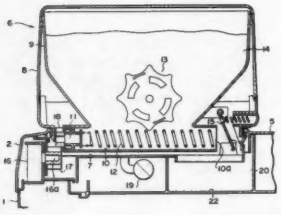
cleanser feeding amount-setting means for setting a target amount of cleanser desired to be fed from said cleanser feeding means;

driving means for selectively applying an AC source voltage from an AC power source to said synchronous motor;

frequency determining means for determining a frequency of the AC source voltage;

counting means for counting a number of cycles of the AC source voltage beginning at a time when the AC source voltage is first applied to said synchronous motor;

driving time-setting means receiving said target amount of cleanser, for setting a driving time corresponding to said target amount in units of frequencies of the AC source voltage;



reference cycle number-setting means for setting a total number of cycles of the AC source voltage which corresponds to the driving time set by said driving time setting means, in units of frequencies of the AC source voltage; and

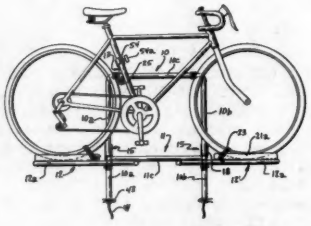
motor control means for comparing a count output from said counting means with the total cycle number from said reference cycle number-setting means which corresponds to a determination result from said frequency determining means and for controlling said driving means to stop application of the AC source voltage to said synchronous motor when the count and the total cycle number coincide with each other.

4,875,608

VEHICLE MOUNTED FOLDABLE BICYCLE CARRIER

John W. Graber, Stoughton, Wis., assignor to Graber Products, Inc., Madison, Wis.

Filed Jun. 21, 1988, Ser. No. 209,363
Int. Cl.[4] B60R 9/10
U.S. Cl. 224—42.03 B **16 Claims**



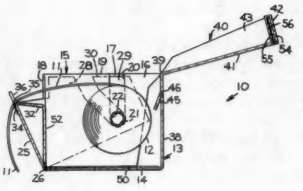
1. A foldable bicycle carrier for mounting on a vehicle comprising, a generally upright main frame having means for mounting the main frame on a vehicle at a rear end thereof, an auxiliary frame including first and second spaced side members each having one end swingably mounted on the main frame for movement about a horizontal axis between a folded position extending upwardly from said one end alongside said main frame and an erected position extending rearwardly from said one end, first and second bicycle support means respectively pivotally attached to the first and second side members for movement about an axis generally paralleling the associated side member between a folded position in which the first and second bicycle support means extend from the associated side member in a direction toward the other side member into overlapping relation and an erected position in which the first and second bicycle support means extend generally horizontally from the associated side member in a direction away from the other side member, at least one bicycle wheel receiving channel on each of the first and second bicycle support means, said wheel receiving channels extending generally horizontally and opening upwardly for supportably receiving the wheels of a bicycle when the first and second bicycle support means are in said erected position, and bicycle stabilizer means mounted on the main frame for engaging a bicycle at a location above said bicycle wheel receiving channels.

4,875,609

DISC DISPENSER

Jerome E. Elder, Blaine, and Nancy L. Mosman, Saint Fridley, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Mar. 4, 1988, Ser. No. 164,389
Int. Cl.[4] B26F 3/02
U.S. Cl. 225—13 **16 Claims**



1. A dispenser for concatenated pressure sensitive adhesive coated abrasive discs disposed in a supply roll around a core having a through opening, said dispenser comprising:

a corrugated fiberboard container having a bottom wall, opposite side walls projecting generally at right angles from opposite edges of said bottom wall and each having inner and outer layers, a front edge, and a top edge, said inner layers of said side walls having aligned slots extending from said top edges to inner ends positioned generally central of said side walls and having support edges defining the inner ends of said slots,

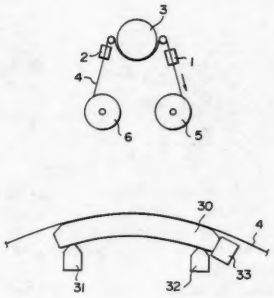
a shaft extending between the outer layers of said side walls and having ends supported on said support edges, said shaft being adapted to extend through and support the core for rotation around said shaft;

said container also having a front wall having a bottom edge pivotably mounted on said bottom wall, projecting along the front edges of said side walls, having opposite edges each adjacent one of said side walls, and having retaining members attached at the opposite edges of said front wall and each projecting between the layers of a different one of said side walls, said front wall being pivotable relative to said side walls between a storage position with said front wall disposed generally at a right angle relative to said bottom wall, and a dispense position with said front wall disposed at an obtuse angle relative to said bottom wall, and said retaining members having retaining portions spaced from the slots in the inner layers of said side walls when said front wall is in said storage position, and projecting across said slots and engaging portions of said shaft adjacent the top edges of said side walls to help retain said shaft against the support edges when said front wall is in said dispense position.

4,875,610
METHOD OF AND SYSTEM FOR DRIVING MAGNETIC TAPE

Tatsuji Kitamoto, Kanagawa; Katsuya Yokoyama, and Takuji Sekiguchi, both of Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Nippon Hoso Kyokai, Tokyo, both of, Japan

Filed May 20, 1988, Ser. No. 196,522
Claims priority, application Japan, May 22, 1987, 62-125581; May 22, 1987, 62-125582; May 22, 1987, 62-125583
Int. Cl.[4] B65H *20/36*
U.S. Cl. 226—10 21 Claims

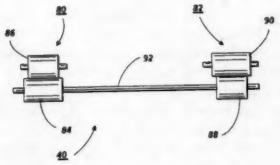


1. A method of driving a magnetic tape comprising steps of generating a unidirectional traveling-surface-wave by ultrasonic oscillation on a surface of a first oscillator, and pressing the surface of the oscillator a surface of the magnetic tape, thereby running the tape in the direction opposite to the traveling d of said surface-wave.

4,875,611
ROLL MEDIA FEED ROLL SYSTEM

Raymond E. Poehlein, Fairport, and Franklin S. Reese, Victor, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 10, 1987, Ser. No. 131,066
Int. Cl.[4] B65H *20/02*
U.S. Cl. 226—186 3 Claims



1. A feed roll system for feeding web media from a supply source along a feed path, the system including

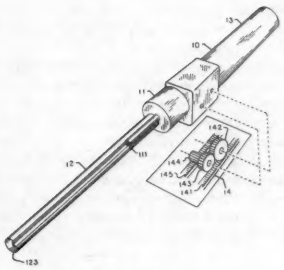
a first and second drive roll pair, in horizontal, axial alignment along the feed path, said first drive roll pair including a hard, high friction drive roll in compressive relationship with an, elastomer-covered idler roll, the first roll pair forming a first nip area therebetween, said second drive roll pair being axially spaced from said first drive roll pair and including an elastomer-covered, high friction drive roll in compressive relationship with a hard roller, the second roll pair forming a second nip area therebetween,

whereby said first drive roll pair controls the media velocity through said first nip area and said second roll pair adjusts its drive velocity through said second nip area to match that of said first drive pair.

4,875,612
GUIDED HAMMER

Lawrence L. Lee, 3776 Martha St., San Diego, Calif. 92117

Filed Aug. 5, 1988, Ser. No. 228,976
Int. Cl.[4] B25L *7/00*
U.S. Cl. 227—147 11 Claims



1. An improved impact apparatus of the type in which

an impact member delivers an impact to a work piece;

an elongated guide means confines the motion of said impact member to within a predetermined path;

an input means receives input movement, said input movement being received as an input force along an input axis causing the input means to move at an input velocity; and

a speed multiplying means transmits the input movement to said impact member as an output force along an output axis, causing the impact member to move at an output velocity which is faster than said input velocity;

wherein the improvement comprises:

a guide means having a longitudinal groove of uniform crossection near its operative position,

an impact member having an impact face that fills the crossectional area of the groove such that any work piece that has been placed into said groove will be struck by said impact face.

2. An improved impact apparatus of the type in which

an impact member delivers an impact to a work piece;

an elongated guide means confines motion of said impact member to within a predetermined path;

an input means receives input movement, said input movement being received as an input force along an input axis causing said input means to move at an input velocity; and

a speed multiplying means transmits the input movement to said impact member as an output force along an output axis, causing the impact member to move at an output velocity which is faster than said input velocity; said speed multiplying means comprising a plurality of rack and pinion gears;

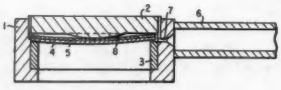
wherein the improvement comprises:

at least two pinion gears centered around at least two separate axles to enable at least two rack gears to be positioned on the same side of the pinion gears.

4,875,613
APPARATUS FOR MANUFACTURING A LAMINAR BOND

Franz Kloucek, Wettingen; Per-Olof Larsson, Nussbaumen, and Ernst Vogt, Remigen, all of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Division of Ser. No. 168,396, Mar. 15, 1988, Pat. No. 4,832,253.
This application Mar. 16, 1989, Ser. No. 324,016
Claims priority, application Switzerland, Apr. 3, 1987, 1287/87
Int. Cl.[4] B23K *37/04*
U.S. Cl. 228—44.3 2 Claims



1. Apparatus for bonding two wafer members having different coefficients of thermal expansion comprising

(a) an essentially ring-shaped housing (1) of a material of low thermal expansion;

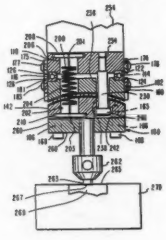
(b) said housing supporting at a first end a ring-shaped thermal expansion element (3) of a material of higher thermal expansion mounted concentrically in the housing (1), which supports the wafer arrangement on one side at the wafer edge; and

(c) said housing threadedly supporting at its other end a screw closure (2) located opposite the thermal expansion element (3), which presses against the wafer arrangement supported on the thermal expansion element (3) with a central pressure nose (8) mounted in its interior.

4,875,614
ALIGNMENT DEVICE

Thomas M. Cipolla, Hopewell Junction; Raymond R. Horton, Dover Plains, both of N.Y.; Philip Murphy, New Fairfield, Conn., and Michael J. Palmer, Walden, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,713
Int. Cl.[4] B23K *20/02*
U.S. Cl. 228—5.5 28 Claims



1. An apparatus for adjusting the orientation of a first surface of a first body to be substantially against a second surface of a second body when said first surface is pressed against said second surface, said apparatus comprising:

a support for said first body;

means for pressing said first surface against said second surface;

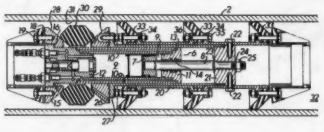
means for movably mounting said first surface by curved surfaces to said support, permitting rotation of said first surface about a first axis and a second axis, so that when said support is moved to press said first surface against said second surface, said first surface rotates about said first and second axis, resulting in said first surface being substantially against said second surface; and

said first axis and said second axis are substantially fixed in orientation and position with respect to said support as said first surface rotates.

4,875,615
VAPOR PLUG FOR TEMPORARILY SEALING OR PLUGGING A PIPELINE

Donald D. Savard, Edmonton, Canada, assignor to Interprovincial Pipe Line Company, Edmonton, Canada

Filed Mar. 6, 1989, Ser. No. 319,169
Int. Cl.[4] B23K *37/00*
U.S. Cl. 228—119 4 Claims



1. A vapor plug, adapted to be inserted into the open end of a pipeline and actuated to expand radially to seal the bore of the pipeline, said plug further being adapted to contract in response to the application of pressure through the bore of the pipeline, comprising:

a cylinder forming a chamber and having a fluid-tight piston positioned to work therein;

first passage means for injecting fluid into one end of the chamber and second passage means for removing fluid from the other end of the chamber;

means forming a third passage for enabling fluid to move from one end of the cylinder chamber to the other;

a valve, in communication with the bore of the pipeline and adapted to control fluid flow through the third passage, said valve being operative to be moved from a closed mode, in which fluid is blocked from moving through the third passage, and an open mode, in which fluid may move through the third passage, thereby freeing the piston for axial movement in the chamber, said valve being adapted to be moved from the closed mode to the open mode in response to the application of pressure in the bore of the pipeline;

an elastic resilient seal ring carried by the cylinder and extending in a generally vertical plane, said ring being adapted, when expanded radially, to seal against the inner surface of the pipeline wall;

means, connected with the cylinder piston, for radially expanding the seal ring; and

normally closed valve means operative to close the ends of the first and second passage means to lock fluid in the cylinder, whereby the piston may be fixed in the ring-expanded mode, when the valve is in the closed mode;

said seal ring being operative, when the valve is in the open mode, to contract, whereby the plug may be pumped down the pipeline.

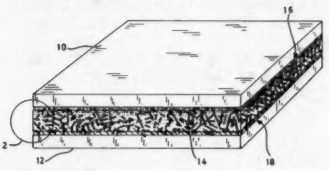
4,875,616
METHOD OF PRODUCING A HIGH TEMPERATURE, HIGH STRENGTH BOND BETWEEN A CERAMIC SHAPE AND METAL SHAPE

Richard D. Nixdorf, Knox County, Tenn., assignor to America Matrix, Inc., Knoxville, Tenn.

Filed Aug. 10, 1988, Ser. No. 230,452
Int. Cl.[4] B23K *20/00*; B22D *19/04, 19/14*
U.S. Cl. 228—120 9 Claims

1. A method for producing a high temperature, high strength bond between a ceramic body and a metal substrate, which comprises the steps of:

producing a volume of consolidated particulate single crystals of a selected shape of a composition matching said ceramic body, said particulate shape selected from whiskers, fibers, platelets and sponges;
sintering said volume of consolidated single crystal particulate shapes to form a high strength preform;
grinding a first surface of said preform to a contour to substantially conform to a selected surface of said ceramic body;
grinding an opposite face of said preform to substantially conform to a selected surface of said metal substrate;
coating said selected surface of said ceramic body with a ceramic slip formed from fine ceramic particles, of a composition matching said ceramic body, in an organic liquid phase;



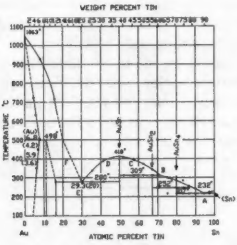
pressing said first face of said preform into said slip coating;
heating said ceramic body, said slip coating and said preform under time/temperature conditions to sinter said preform to said ceramic body;
covering said opposite face of said preform with molten material of a composition corresponding to that of said metal substrate;
pressing said molten metal material into said preform and allowing said molten material to solidify; and
pressure bonding said metal substrate to said solidified material to thereby achieve said joining of said ceramic body to said metal substrate.

4,875,617

GOLD-TIN EUTECTIC LEAD BONDING METHOD AND STRUCTURE

Elya L. Citowsky, 1240 Holly St., San Carlos, Calif. 94070

Continuation-in-part of Ser. No. 4,958, Jan. 20, 1987, abandoned. This application Jul. 14, 1988, Ser. No. 219,333
Int. Cl.[4] B23K *31/02;* **H01L** *23/48, 29/54*
U.S. Cl. 228—123 **16 Claims**



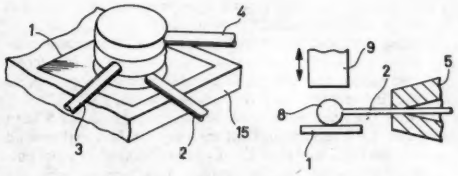
1. A method for making a gold-tin alloy bonding structure for an integrated circuit chip having a plurality of bonding pads, which comprises forming a first layer of gold on a substrate carrier, forming a second gold layer on said integrated circuit chip, forming an at least 80 weight percent gold-tin alloy body on at least one of said first and second gold layers, said first and second gold layers each having a thickness of at least about 5 percent of a thickness of said at least 80 weight percent gold-tin alloy body, placing said at least 80 weight percent gold-tin alloy body between said first and second gold layers, and bonding said at least 80 weight percent gold-tin alloy body to said first and second gold layer by heating said at least 80 weight percent gold-tin alloy body and said first and second gold layers to a temperature sufficient to bond said at least 80 weight percent gold-tin alloy body and said first and second gold layers together to provide the bonding structure in which said at least 80 weight percent gold-tin alloy body is gold enriched and a portion of said first and second gold layers remain unalloyed.

4,875,618

WIRE STACKED BONDING METHOD

Hiroshi Hasegawa, Kanagawa; Koichi Sugimoto, Hiratsuka; Takeshi Yano, Yokohama; Tositada Netsu, Hatano; Mitsukiyo Tani, Odawara, and Tosaku Kojima, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 27, 1987, Ser. No. 112,943
Claims priority, application Japan, Oct. 31, 1986, 61-258232
Int. Cl.[4] H01L *21/60*
U.S. Cl. 228—179 **9 Claims**



1. A wire stacked bonding method wherein ends of a plurality of wires are stacked on a bonding pad which comprises a first series of steps including:
a step of melting an end of one wire of a plurality of wires to form a ball at the end of the wire;
a step of positioning the ball on a planar surface of the bonding pad with the wire extending in parallel with the planar surface; and
a step of heating and pressing the ball to form the ball into a first disc-like form and to bond the first disc-like form to said bonding pad;
followed by a second series of steps including:
a step of heating an end of another wire of said plurality of wires to form a ball at the end of the other wire;
a step of positioning the ball at the end of the other wire on an exposed surface of the first disc-like form with the other wire extending in parallel with the surface of the bonding pad;
a step of heating and pressing the ball to form a second disc-like form and to bond the second disc-like form onto the surface of the first disc-like form bonded to the bonding pad thereby forming a stack of the disc-like forms bonded onto the bonding pad.

4,875,619

BRAZING OF INK JET PRINT HEAD COMPONENTS USING THIN LAYERS OF BRAZE MATERIAL

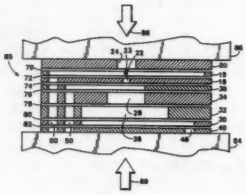
Jeffrey J. Anderson, 12540 SW. Edgewood, Portland, Oreg. 97225, and John S. Moore, 15087 NW. Oakmont Loop, Beaverton, Oreg. 97005

Filed Sep. 1, 1988, Ser. No. 239,587
Int. Cl.[4] B23K *20/00*
U.S. Cl. 228—190 **14 Claims**

1. A method of bonding a first surface of a first metal component of an ink jet print head having at least a first preformed aperture to a second surface of a second metal component of the ink jet print head having at least a second preformed aperture, the first and second components being of materials having the same or similar coefficients of thermal expansion, the first

and second surfaces being bonded together with the first aperture in alignment with the second aperture, the method comprising:

placing a layer of a filler material on at least one of the surfaces, the filler material having a melting point which is below the melting points of the first and second components, the total thickness of the filler material on the first and second surface together being in the range of from approximately one-sixteenth micron to approximately five microns;



aligning the first and second apertures with the first and second surfaces abutting one another;

loading the components with a pressure of from about one-half psi to no more than about one hundred psi in a direction passing through the first and second surfaces to press the first and second surfaces together; and

melting the filler material while the components are loaded with the pressure without melting the first and second components to braze the first and second components together with the first aperture in alignment with the second aperture.

4,875,620

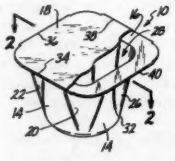
FLUTED PRODUCT CUP

William A. Lane, Sr., Redlands, Calif., assignor to W. A. Lane, Inc., San Bernardino, Calif.

Filed Nov. 2, 1988, Ser. No. 266,409

Int. Cl.[4] B65D *1/20*

U.S. Cl. 229—1.5 B **20 Claims**



1. A packaging cup comprising:

a resilient integrally formed body having a product reservoir and a lip;

said reservoir including a flat bottom wall and a continuous side wall integrally formed together, said side wall extending from said bottom wall to said lip and integrally joined to said lip;

the joint between said lip and said side wall continuously surrounding and defining an opening through said lip to the interior of said reservoir, said lip extending in a plane outwardly from said opening completely around the periphery of said opening;

said bottom wall essentially circular in shape;

said opening essentially squarish in shape;

first, second, third and fourth fluted areas as viewed from the interior of said reservoir located in said side wall at the corners of said squarish shaped opening, each of said fluted areas shaped essentially as a conical surface generated from a cone truncated by a plane about a parabolic intersection of the plane with the cone and having the base of the conical surface located at the joint of the lip with the side wall and the apex of the conical surface oriented towards said bottom wall and further including the remainder of said side wall being smooth; and

three of said fluted areas being identical and the remaining one of said fluted areas being disimilar with respect to the three identical fluted areas.

4,875,621

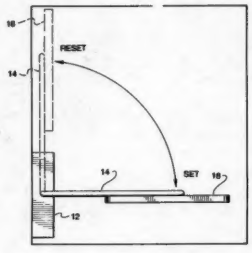
APARTMENT MAILBOX SIGNAL DEVICE

Dolores Chivers, 3109 Clinton Ave. South, Minneapolis, Minn. 55408

Filed Jun. 27, 1988, Ser. No. 212,340

Int. Cl.[4] B65D *91/00*; A47G *29/12*

U.S. Cl. 232—34 **11 Claims**



1. An apartment mailbox signal device for use inside an apartment mailbox having at least one opening for receiving mail, comrpsing:

signal means for indicating the presence of outgoing mail in the mailbox;

a generally L-shaped rotatable arm operably connected to the signal means for supporting the signal means and selectively rotating the signal means; and

a detachable mounting base including:

means for selectively securing the mounting base to an interior wall for the apartment mailbox; and

means for receiving the rotatable arm and allowing the rotatable arm to pivot about an axis generally parallel with the interior wall of the apartment mailbox to which the mounting base is secured,

such that the signal means may rotate between a position generally perpendicular with the opening whereby the signal means is generally not visible from the opening and a position generally parallel with the opening whereby the signal means is visible form the opening.

4,875,622

BREAKAWAY FREESTANDING ROADSIDE STRUCTURE AND METHOD FOR CONSTRUCTION THEREOF

Rollie T. Lents, Orlando, Fla., assignor to James A. Waddell, Orlando, Fla.

Filed Jun. 23, 1988, Ser. No. 210,753

Int. Cl.[4] B65D *91/00*

U.S. Cl. 232—39 **20 Claims**

1. A breakaway freestanding roadside structure, comprising:

a preformed block of rigid lightweight plastic foam material having a cutout therein;

one or more coatings of cementitious material applied to the outside of said block;

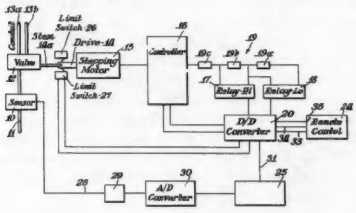
a mailbox secured within said cutout.

4,875,623

VALVE CONTROL

Charles A. Garris, Vienna, Va., assignor to Memrysafe, Inc., Norwalk, Conn.

Filed Jul. 17, 1987, Ser. No. 74,885
Int. Cl.[4] G05D *23/185*
U.S. Cl. 236—12.12 **10 Claims**



1. In a system for providing and maintaining a predetermined temperature in a flowing liquid carried in a flow system of liquids of different temperatures, the combination comprising

a supply means comprised of at least two liquids of different temperatures

a mixing control valve capable of adjusting the mixing of at least two supplies of liquid at different temperatures in variable proportions

means adjacent the mixing control valve for observing the temperature of a liquid flowing out of the flow system and providing data in digital signals correlated to said observed temperature,

means responsive to observation of a temperature value of a liquid drawn through the flow system to generate signals, summarized in digital form, for evaluation of the temperature of the liquid drawn through the flow system

means for introducing into the system a signal in binary form indicative of a preselected temperature value of the liquid at the outlet of the flow system,

means for comparing the binary data generated by the observed temperature value and the binary data generated by the preselected temperature value for providing signals,

means for selecting the rate of change of the relative proportions of said two liquids

comprising means responsive (i) to a first predetermined difference between the said observed temperature and said predetermined temperature for transmitting a first set of signals to means for operating the mixing control valve to change the relative proportions of the two liquids at a relatively rapid rate

(ii) to a second predetermined difference between the said observed temperature and said predetermined temperature for transmitting a second set of signals to said means for operating the mixing control valve to change the relative proportions of the two liquids at a less rapid rate

and (iii) to a third predetermined difference between said observed temperature and said predetermined temperature for transmitting a third set of signals to said means for operating the mixing control valve to change the relative proportions of the two liquids at a less rapid rate,

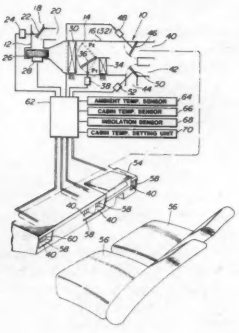
whereby the predetermined temperature is provided gradually by reducing the rate of change of the relative proportions of the two liquids.

4,875,624

AIR CONDITIONER SYSTEM FOR AUTOMOTIVE VEHICLE

Junichiro Hara; Yoshiyuki Ogihara, and Hideo Takahashi, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 25, 1988, Ser. No. 275,988
Claims priority, application Japan, Nov. 25, 1987, 62-296420
Int. Cl.[4] F24F *13/10*
U.S. Cl. 236—49.5 **10 Claims**



1. An air conditioner system for an automotive vehicle comprising:

conditioning air passage means defining a conditioning air path and including an air outlet which opens into a vehicular cabin for discharging conditioning air into said vehicular cabin;

conditioning air generating means for adjusting temperature of the conditioning air to be discharged into said vehicular cabin;

temperature setting means for desired temperature of the conditioning air in said vehicular cabin to produce a first signal indicative of the set temperature;

sensor means for monitoring the condition in said vehicular cabin to produce a second signal indicative of the vehicular cabin temperature;

first control means for adjusting discharge amount of said conditioning air into said vehicular cabin depending upon the relation between said first and second signal values, said first control means causing said discharge amount to fluctuate so as to increase and decrease after the difference between said first and second signal values becomes less than a prdetermined value; and

second control means for controlling direction of the conditioning air discharged from said air outlet between a first direction in which the conditioning air discharged from said air outlet is concentrated on the occupants of the vehicular cabin, and a second direction in which the conditioning air is diffused into the vehicular cabin, said second control means causing said conditioning air to be directed in said first direction, a predetermined time be-

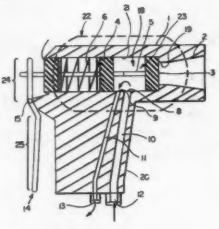
fore said discharge amount increases beyond a predetermined set value.

4,875,625

CONSTANT FLOW DEIONIZED WATER SPRAY GUN

Bruce A. Jones, Hopkinton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Oct. 9, 1987, Ser. No. 107,620
Int. Cl.[4] B05B *9/00*
U.S. Cl. 239—124 **9 Claims**



1. A spray gun comprising:

A. barrel means including a generally cylindrical sidewall defining a bore and having a forward open discharge end, inlet means through said sidewall adapted to permit a fluid to enter said barrel means, and outlet means through said sidewall situated generally rearwardly from said inlet means; and

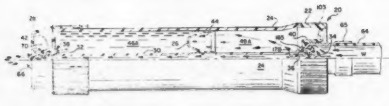
B. actuator means including sealing means situated in said bore and configured to sealingly engage said sidewall of said barrel means and means for moving said sealing means between an on position forward of said inlet means and an an position between said inlet means and said outlet means, so that when said sealing means is in said off position fluid flowing into said bore through said inlet means flows out said outlet means, and when said sealing means is in said on position fluid flowing into said bore through said inlet means flows out said discharge end of said bore.

4,875,626

PISTON-POWERED DISPENSING SYSTEM

James E. Buhler, Waterford; James R. Crapser, Caledonia; Allen D. Miller, Mount Pleasant, and Mark E. Wefler, Caledonia, all of Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 153,737, Feb. 8, 1988, Pat. No. 4,767,059. This application Aug. 29, 1988, Ser. No. 238,026
The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.
Int. Cl.[4] B05B *7/24*
U.S. Cl. 239—314 **4 Claims**



4. A piston-powered dispensing system comprising:

an apertured base;

a hollow cylinder defining a longitudinal axis, the cylinder carrying the base at one end portion thereof and further defining a hollow neck at the opposite end portion thereof;

an apertured piston defining a circumferential portion that is slidably engageable with the hollow cylinder substantially along the length of an inner surface thereof and disposed in the cylinder for dividing the cylinder into at least two chambers;

an orificed overcap carried by the cylinder and rotatable about the longitudinal axis relative thereto, the overcap defining a fluid-mixing region and a throat that is slidably engageable with an inner surface portion of the cylinder neck;

an elongated fluid passageway means carried by the overcap and disposed through the piston aperture in a fluid-tight manner;

a hollow extension, slidably engageable with the inner surface portion of the cylinder neck and carried by the overcap throat, whereby rotation of one of the overcap and cylinder relative to the other about the longitudinal axis thus causes movement along the longitudinal axis of the cylinder neck relative to both of the extension and overcap throat;

first valve means carried by the base for controllably affecting flow of a pressurized fluid from a pressurized-fluid source into the fluid passageway means and into one of the two cylinder chambers;

second valve means carried by the fluid passageway means and abuttingly engaging the first valve means for controllably affecting flow of the pressurized fluid through the fluid passageway means; and

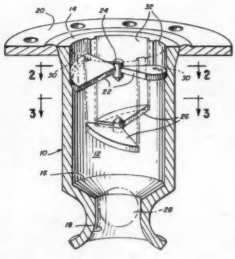
third valve means provided by said movement along the longitudinal axis of the cylinder neck relative to both of the extension and overcap throat, for controllably affecting flow between an other one of the two cylinder chambers and the fluid-mixing region, whereby said movement of said one of the overcap throat and cylinder neck relative to said other along the longitudinal axis simultaneously causes the first and second valve means to co-act in such a manner as to controllably affect flow of the pressurized fluid from the pressurized-fluid source into and through the fluid passageway means and into said one of the two cylinder chambers.

4,875,627

FREE PASSAGE NOZZLE

John W. Coulston, Winfield, Ill., and David C. Huffman, Merrimack, N.H., assignors to Lechler, Inc., St. Charles, Ill.

Filed Jul. 8, 1988, Ser. No. 216,640
Int. Cl.[4] B05B *1/34, 1/26*
U.S. Cl. 239—466 **6 Claims**



1. A solid-cone spray nozzle for liquids comprising

a shell defining a cylindrical interior space having an ingress opening at one end and a reducing wall at the other end having therein a central orifice,

said shell having therein a pair of opposed flow-directing vanes extending from the shell wall into said interior space toward the axis thereof,

each said vane being pitched so as to deflect the flow of liquid impinging thereupon into a helical path in the same

rotative direction about the axis of said space to induce a vortex in the through-flowing liquid,

said cylindrical space having on both sides of said opposed vanes an unobstructed cross-sectional area comprising approximately a quadrant of the cross-section of said cylindrical space, and capable of circumscribing a circle of the diameter of said orifice, and

a second pair of opposed flow-direction vanes sized like those of the first-mentioned pair and having the same orientation with respect to each other and to said cylindrical space but being rotatively displaced a quarter-turn from said first-mentioned pair and axially spaced therefrom a minimum distance equal to the diameter of said orifice.

4,875,628

METHOD AND APPARATUS FOR CRUSHING BRITTLE MATERIAL FOR GRINDING

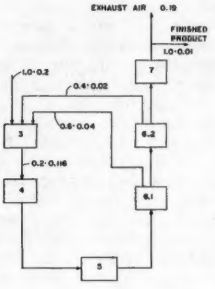
Osbert Knobloch, Rheda-Wiedenbrück, and Manfred Müller, Ennigerloh, both of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,077

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717975

Int. Cl.[4] B02C *23/12*

U.S. Cl. 241—24 **16 Claims**



1. The method of crushing fresh brittle material to prepare said material for grinding, said fresh material having a moisture content higher than a critical value above which satisfactory crushing is inhibited, said method comprising:

(a) pre-mixing selected proportions of said fresh brittle material in a pre-mixing stage with selected proportions of at least partially processed other material having a moisture content sufficiently lower than that of said fresh material to reduce the moisture content of all the resultant pre-mixed material to a value no greater than said critical value;

(b) crushing said pre-mixed material; and

(c) thereafter disagglomerating, drying, and classifying said crushed pre-mixed material in a selected sequence.

4,875,629

PARTICLE PULVERIZER INJECTION NOZZLE

Kenneth A. Brors, New Brighton, Minn., assignor to Air Powder Systems, Hastings, Minn.

Filed Sep. 2, 1988, Ser. No. 240,841

Int. Cl.[4] B02C *19/06*

U.S. Cl. 241—39 **14 Claims**

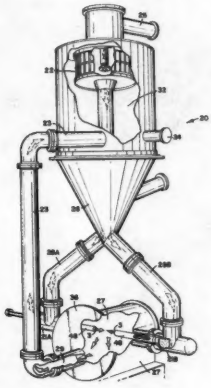
1. An injector for projecting solid material in an impact pulverizer, said injector comprising:

(a) nozzle member having a central conduit with an inlet end and an outlet end, said nozzle member including a nozzle tip proximate said outlet end;

(b) means for circulating solid particles to said inlet end of said conduit;

(c) a barrel positioned proximate said outlet end of said conduit and being in axial alignment with said conduit, said barrel being in horizontal alignment and having a barrel diameter larger than the diameter of said conduit;

(d) a circumferential air passage surrounding said nozzle member, said air passage having an inlet end and an outlet end, said inlet end including an inlet aperture, said outlet end being in fluid communication with said barrel, wherein said air passage has an inner surface an outer surface, each having an angle of taper with respect to



horizontal, said outer surface having a first and second angles of taper, the intersection of which forms a throat in said air passage, said first angle of taper extending substantially all of the length of said air passage and causing said air passage to converge and said outer surface having a second angle of taper between the throat and its intersection with the horizontal wall of said barrel which causes said air passage to diverge, said second angle of taper being approximately fifteen degrees; and

(e) means for supplying a motive fluid through said inlet aperture so as to direct the fluid tangentially into said air passage.

4,875,630

LEAF VACUUM AND SHREDDER

William P. Carlson, P.O. Box 2325, Kailua-Kona, Hi. 96745

Filed Oct. 11, 1988, Ser. No. 255,325

Int. Cl.[4] B02C *13/28*

U.S. Cl. 241—56 **8 Claims**

1. A comminuting apparatus including:

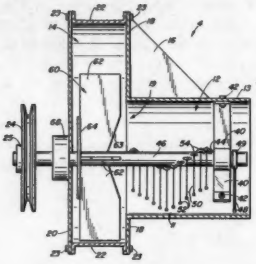
a rotatable drive shaft having a circumference;

means for driving the shaft;

means for sucking air and matter to be comminuted past the shaft;

a plurality of mounting pivots, the mounting pivots affixed

to the circumference of the shaft on a line of helical configuration; and



a plurality of loose stiff metal wire whips moveably affixed to the mounting pivots.

4,875,631

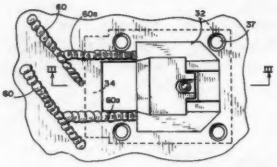
WEAR PROTECTION CHIPPER DISC

Gary M. Bardos, Mt. Pleasant, Mich., assignor to Recycling Systems, Inc., Winn, Mich.

Filed Jan. 23, 1989, Ser. No. 300,049

Int. Cl.[4] B27C *7/12*

U.S. Cl. 241—92 **14 Claims**



1. A chipper for wood material such as stumps, chunks of wood, roots, limbs, old lumber and the like, comprising:

a rotational chipping disc having a periphery and an axis of rotation and adapted to be driven in one rotational direction;

a support for material to be advanced to said disc;

said rotational disc having a front face normal to said axis, and a series of knife mounting pockets in said disc for mounting knives to extend axially from said front face, diagonally at an acute angle toward said direction of disc rotation, and having chip passage slots extending through said disc adjacent said pockets;

hardened deflector protrusions on said disc front face, projecting axially therefrom, and offset from said pockets toward said direction of rotation, and said protrusions being of a material having a hardness sufficiently greater than that of said disc that said protrusions inhibit wear of said disc at said chip passage slots.

4,875,632

WEB DIVIDING AND REWINDING MACHINE AND METHOD FOR REMOVING REWIND ROLLS THEREFROM

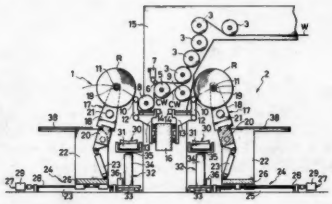
Hiroshi Kataoka, Iyomishima, Japan, assignor to Kataoka Machine Co., Ltd., Ehime, Japan

Filed Apr. 7, 1988, Ser. No. 178,561

Claims priority, application Japan, Apr. 9, 1987, 62-88534; Sep. 4, 1987, 62-221309

Int. Cl.[4] B65H *17/12*

U.S. Cl. 242—56.2 **1 Claim**



1. A web dividing and rewinding machine comprising a front section and a rear section which are similar construction and operate in a similar manner, a plurality of slitters for dividing a wide web into a plurality of elongated longitudinal sub-webs, a plurality of pairs of rewind core supporting arms mounted on a core holder arranged in each of the front and rear sections, a rewind core supported on each pair of the rewind core supporting arms for rewinding said sub-web thereon, said rewind core being rotated in contact with a contact roller, means for moving said rewind core supporting means in a longitudinal direction of said web, and a pair of carrying apparatus, each of which includes a conveyor for transferring the rewind rolls wound on the rewind core in the longitudinal direction of the central axis of the roll and an elevator for moving up and down the conveyor, each said carrying apparatus being arranged in a space between the front and rear sections and installed at the under side of said rewind core holder for removing rewind rolls from the machine.

4,875,633

PAPER SPLICING DEVICE

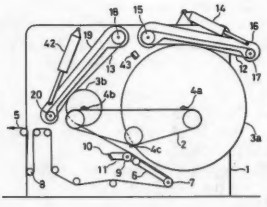
Seiji Mochizuki, Hachiohji, and Fumiyasu Kato, Fussa, both of Japan, assignors to Toppan Moore Company, Ltd., Tokyo, Japan

Filed Mar. 29, 1988, Ser. No. 174,610

Claims priority, application Japan, Mar. 31, 1987, 62-47829[U]

Int. Cl.[4] B65H *19/16*

U.S. Cl. 242—58.3 **2 Claims**



1. A paper splicing device for splicing paper of a preceding to a succeeding paper roll having a tuning mechanism for tuning paper delivery speed of the succeeding paper roll to that of the preceding paper roll from which paper is fed while

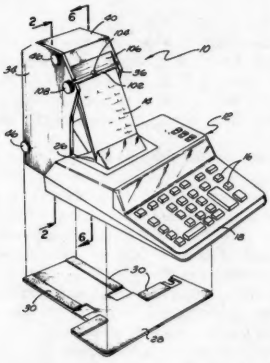
rotated, wherein a start portion of the paper of the succeeding paper roll is adhered to the paper of the preceding paper roll while peripheral speeds of said preceding and succeeding paper rolls are tuned to each other, said paper splicing device being characterized in that said timing mechanism is provided with connection means for connecting a first rotor rotating in contact with a peripheral surface of the preceding paper roll and a second rotor rotating in contact with a peripheral surface of the succeeding paper roll to a single driving source, said connection means transmitting a driving force to the first rotor from the driving source, and a tuning control section connected to the second rotor from a connection system by said connection means through an electromagnetic powder clutch capable of varying the driving so that a rotary peripheral speed of said second rotor rotating in contact with the peripheral surface of said succeeding paper roll can be gradually tuned to a rotary peripheral speed of said first rotor rotating in contact with the peripheral surface of said preceding paper roll.

4,875,634

PAPER TAPE ROLL CONTROL UNIT

Theodore Lapadakis, 9827 Mason Ave., Chatsworth, Calif. 91311

Filed Jul. 25, 1988, Ser. No. 223,782
Int. Cl.[4] B65H *16/06*
U.S. Cl. 242—67.3 R **13 Claims**



1. A paper tape control unit adapted for use with a business machine or the like having means for drawing and using an elongated strip of paper tape, and then for discharging the paper tape, said control unit comprising:

a control unit housing;

a supply reel carrying a roll of paper tape in elongated strip form for supply to the business machine;

a take-up reel for rewinding of the paper tape discharged from the machine;

means for supporting said supply and take-up reels for rotation within said housing, said supply reel being positioned for drawing of the paper tape thereon into association with the business machine by operation of said drawing means for use of the paper tape by the business machine, said supply reel being rotatably driven by said drawing means as the paper tape is drawn from said supply reel, and said take-up reel being positioned for rewinding thereonto of the paper tape used by said business machine;

drive means coupled to the take-up reel to rotatably drive said take-up reel for rewinding of the paper tape thereonto; and

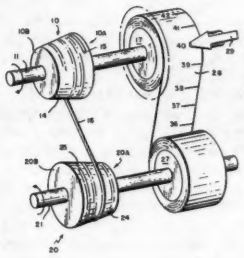
means for intermittently activating said drive means to rewind the paper tape in an intermittent manner, said means for intermittently activating said drive means including switch means for energizing said drive means and means carried by said supply reel for movement therewith, said means carried by said supply wheel being engageable with said switch means for intermittently energizing said drive means in response to supply reel rotation.

4,875,635

PROGRAMMED RATIO MECHANICAL TRANSMISSION

Edward L. Steltzer, Westboro, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Oct. 2, 1987, Ser. No. 104,814
Int. Cl.[4] B65H *18/10, 23/04*
U.S. Cl. 242—67.3 R **14 Claims**



1. A system for transporting a web between first and second reels while maintaining tension in the web, said system comprising:

first and second rotatable frustoconical drums, mechanically coupled to said first and second reels, respectively, and mounted inversely to each other so that the wide end of each drum is juxtaposed with the narrow end of the other;

a cable mechanically linking said drums which is attached near the wide end of the first drum, wound partly around that drum, wound partly around the second drum in the same manner, and then attached at a point near the wide end of the second drum, said cable comprising an elastic material; and

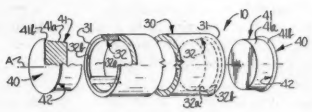
tensioning means, said tensioning means including said cable, for maintaining tension in the web and cable, wherein the cable and web are mounted such that they move in the opposite directions, whereby as the cable is unwound from a drum the web is enwound onto the associated reel.

4,875,636

NON-RETURNABLE NEWSPRINT CARRIER SYSTEM

Daniel D. Kewin, Brantford, Canada, assignor to Sonoco Products Company, Hartsville, S.C.

Filed Nov. 12, 1987, Ser. No. 119,519
Int. Cl.[4] B65D *85/67*
U.S. Cl. 242—68.6 **12 Claims**



1. A non-returnable newsprint carrier system adapted for winding of newsprint, shipping and storing of newsprint and mounting in reels of offset printing presses on stub shafts having a predetermined non-cylindrical outside surface configuration and profile for unwinding of newsprint, and characterized by eliminating the need for return to the newsprint manufacturer, increasing core crush resistance during shipping and

storing, and reducing roll vibration during unwinding in the printing press; said system comprising:

an elongate tubular core of predetermined dimensions for winding of newsprint thereon to form a roll of newsprint and having opposite end portions without metal end caps thereon and defining inside surfaces for receiving therewithin the reel stub shafts to mount the roll of newsprint in the offset printing press, said inside surfaces of said opposite end portions of said tubular core having predetermined non-cylindrical configuration, profile and dimensions for being adapted to be mounted on complementary portions of the outside surfaces of the reel stub shafts of the offset printing press so that said tubular core will be adapted to have a full profile fit in surface-to-surface contact over substantially the entire surface area of the reel stub shafts received within said core, said non-cylindrical configuration comprising means for reducing roll vibration during unwinding of the newsprint in the offset printing press; and

core plugs for being inserted into the end portions of said tubular core after winding of the newsprint roll and during shipping and storage to prevent damage to the end portions of said tubular core and to the newsprint roll, each of said core plugs comprising a solid body without holes or grooves therein, having a generally circular cross-sectional configuration, being formed of wood, plastic or the like crush-resistant material, and having an outside surface area of substantially the same non-cylindrical configuration, profile and dimensions as said inside surfaces of said opposite end portions of said tubular core for being positioned therewithin and a circumferential lip area at the end of said tubular core for suitable engagement or gripping to remove said core plugs from said tubular core.

4,875,637

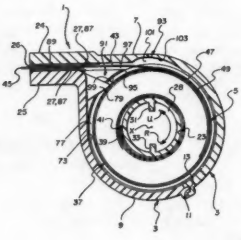
FILM CASSETTE

David E. Beach, Stowe, Vt., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,467

Int. Cl.[4] G03B *17/26*

U.S. Cl. 242—71.1 **6 Claims**



1. An improved film cassette wherein a film spool having a filmstrip coiled about it is rotatable in an unwinding direction to automatically advance a leader portion of said filmstrip along a film passage slit to the outside of the cassette shell and is rotatable in a rewinding direction to wind said leader portion to the inside of said shell at least until a leading end of the leader portion is positioned inward of said slit, and wherein the improvement comprises:

said cassette shell includes first integral guide means, protruding from an inner circumferential wall of the shell to a predetermined location proximate said film passage slit and an outmost convolution of said filmstrip, for guiding said leading end of the leader portion between the inner wall and said outermost convolution to prevent the leading end from entering the slit, and second integral guide means for guiding said leading end directly to said first integral guide means in response to rotation of said film spool in the unwinding direction anytime after the leading end has been wound inward of said slit, whereby said leading end will be prevented from entering the slit.

4,875,638

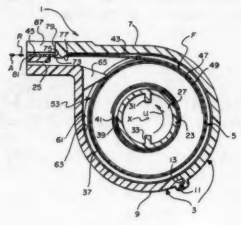
FILM CASSETTE

Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,558

Int. Cl.[4] G03B *17/26*

U.S. Cl. 242—71.1 **9 Claims**



1. An improved film cassette wherein a film spool having a filmstrip coiled about it is rotatable to advance said filmstrip through a film passage slit to the outside of the cassette shell and to return the filmstrip through said film passage slit to the inside of said cassette shell, and wherein the improvement comprises:

film securement means disposed along said film passage slit for engaging a leader portion of said filmstrip when the filmstrip is returned to the inside of said cassette shell;

film support means located proximate said film securement means for supporting said filmstrip within range of the film securement means to permit the securement means to engage said leader portion; and

a trailing portion of said filmstrip, remote from said leader portion, being configured to enable the filmstrip to fall away from said film support means to move out of range of said film securement means when the filmstrip is advanced sufficiently from said cassette shell to position said trailing portion at the film support means, whereby said film securement means cannot engage said leader portion when said filmstrip is returned to the inside of said cassette shell.

4,875,639

DEPTH SETTING DEVICE FOR A SPINNING REEL

John A. Zurcher, Tulsa, Okla., assignor to Zebco Corporation, Tulsa, Okla.

Filed Jul. 26, 1988, Ser. No. 224,577

Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—309 **12 Claims**

1. A line-carrying spool assembly for a fishing reel having an axially spaced front and rear, a housing and a bail assembly having first and second bail ears and first and second bail arms carrying a bail and movably mounted to the bail ears, said line-carrying spool assembly comprising:

a spool having

(a) a hub with a central axis and an annular surface around which line can be wound; and

(b) first and second flanges spaced axially in a fore and aft direction with respect to said hub and extending radially outwardly from said annular hub surface,

said first and second flanges and annular hub surface cooperatively bounding a line storage space,

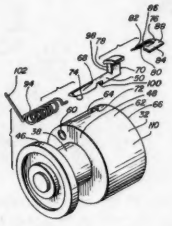
there further being an annular skirt extending axially rearwardly from one of said first and second flanges;

first means for mounting the bail assembly to the housing for rotation relative to the housing so that the bail assembly directs line on to the spool as the bail assembly is rotated;

a line depth setting pin having an elongate body and an operating arm to manually effect movement of said line depth setting pin;

second means for mounting the line depth setting pin to the spool for movement relative to the spool between (a) an operative position wherein the line depth setting pin extends through said line storage space between the first and second flanges radially outwardly of the annular hub surface and (b) a retracted position wherein substantially the entire line depth setting pin resides outside of the spool storage space,

said second mounting means including a bore through one of



said first and second flanges within which said line depth setting pin is guided axially with respect to the spool between said operative and retracted positions, said second mounting means including means on said skirt in addition to said bore for guiding axial movement of said line depth setting pin between said operative and retracted positions,

said operating arm on the line depth setting pin axially coinciding with the bail ears and residing radially inside of said bail ears; and

means for selectively maintaining the line depth setting pin in each of the operative and retracted positions,

said line depth setting pin in said operative position blocking the paying out of line wrapped on the spool hub and positioned so that line being retrieved on the spool wraps around the line depth setting pin,

said pin in said operative position being axially forwardly of the pin in said retracted position.

4,875,640

TAPE CARTIDGE

Hikaru Mizutani, Mino, Japan, assignor to Hitachi Maxell, Ltd., Osaka, Japan

Filed May 12, 1988, Ser. No. 193,071

Claims priority, application Japan, May 13, 1987, 62-116133

Int. Cl.[4] G11B *23/087*

U.S. Cl. 242—198 **3 Claims**

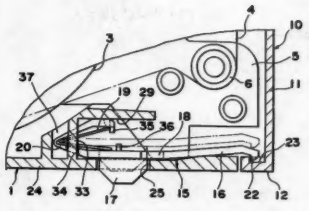
1. A tape cartridge comprising:

a case body (1) having a front lid (10) in the front portion thereof said front lid having an engaging recess (23) formed therein;

lock means (15) accommodated in a side wall (24) of said case body (1) in a space within said case body juxtapositioned to a front tape guide roller in front of a corresponding tape reel, said lock means (15) comprising a lock plate body (18) having a lock tip (16) detachably engaged with said engaging recess (23) defined in said front lid (10);

a release member (17) which projects outside through a window defined in said side wall (24) for pressuring said lock means (15);

guide means for guiding and holding said lock means (15) so that said lock tip (16) may move in a direction parallel with the thickness of said side wall (24) throughout the movement from a locked state in which the free end tip portion of said lock means (15) is engaged with said engaging recess (23) to an unlocked state in which the free end



tip portion of said lock means (15) is detached from said engaging recess (23); and

a spring member (19) for pressing said lock means (15) towards a locked state.

4,875,641

SCREW FOR INSEPARABLY JOINING CASSETTE MEMBERS

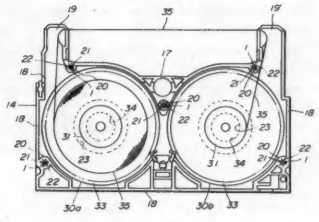
Katsuo Endo, and Masahiro Makino, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,310

Claims priority, application Japan, Apr. 11, 1987, 62-055249[U]

Int. Cl.[4] G11B *23/04*; F16B *25/00, 39/30*

U.S. Cl. 242—199 **21 Claims**



20. A tape cassette incorporating a screw, comprising:

a case composed of an upper half and lower half said lower half having a hole formed therein, and said upper half having a concave area; and

a screw having a shaft, a head integrally formed on an end of said shaft, a thread portion and a plurality of barbed-like projections, said barbed-like projections formed distally to said head on a portion of said shaft and each said projection being frusto-conical in shape having a sharp outer edge with each edge being independent and in non-spiral mutual relationship, said thread portion being formed on an upper end of the shaft of said screw proximal said head, and said plurality of barbed-like projections being formed on a lower portion thereof, said upper half and said lower half of said case being joined by said screw.

4,875,642

LIGHT AIRCRAFT WITH PARACHUTE WING

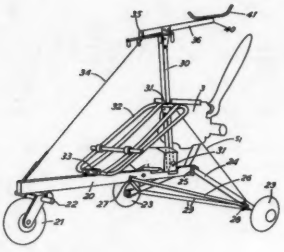
John P. P. Flynn, Hereford, England, assignor to Powerchute Systems International Inc., Hereford, England

Filed Feb. 16, 1988, Ser. No. 155,677

Claims priority, application United Kingdom, Feb. 13, 1987, 8703299

Int. Cl.[4] B64C 39/00

U.S. Cl. 244—13 3 Claims



1. A light aircraft carriage for use with a parachute-wing attached to the carriage by support lines, the carriage being foldable from a running condition to a stowing condition and comprising:

(a) a base strut having a fore and an aft;

(b) a front wheel mounted beneath the base strut substantially near the fore end thereof;

(c) a pair of rear wheels;

(d) a wheel strut for each rear wheel extending between the respective wheel and a respective side of the base strut at the aft end remote from the front wheel;

(e) a tie bar for each rear wheel extending from the wheel end of a respective wheel strut to the base strut at a point intermediate its ends;

(f) a pivoted joint at one end of each tie bar and a detachable fixture at the other end;

(g) a universally pivoted joint at the base strut end of each wheel strut;

(h) one or more tie cables connected between the wheel ends of the wheel struts so as to make an "A" shape therewith in the running condition;

(i) an upright strut having a top, a base, a fore and an aft, pivotally mounted at its base towards the aft of the base strut so as to be foldable along the base strut in the stowing condition and be upstanding from the base strut in the running condition;

(j) a pair of lateral tie cables connected between the wheel ends of the wheel struts and an intermediate position on the upright strut so as to give lateral stability to the upright strut;

(k) a seat frame extending in the running condition, between intermediate positions on the base strut and the upright strut and being detachably fixed at one of said positions and pivoted at the other;

(l) a forward tie cable connected between the front of the base strut and the top of the upright strut;

(m) a mounting for an engine at the rear of the upright strut; and

(n) a support bracket at the top of the upright strut for attaching support lines of the parachute-wing.

4,875,643

STARTER ARRANGEMENT FOR A HELICOPTER

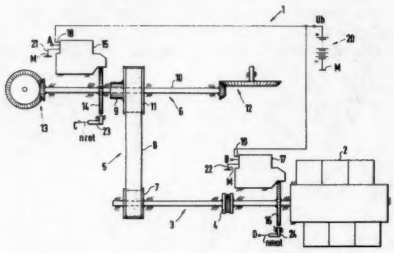
Staas Gietzen, Leonberg; Hans Weiner, Mühlacker; Klaus Hain, Leonberg; August Hofbauer, Pforzheim, and Juergen Hawener, Möglingen, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Stuttgart, Fed. Rep. of Germany

Filed Sep. 21, 1988, Ser. No. 247,335

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 3736110

Int. Cl.[4] B64D 31/02

U.S. Cl. 244—53 A 18 Claims



1. A starter arrangement for a helicopter driven by means of a reciprocating piston internal combustion engine, comprising at least one override clutch means arranged in a drive connection means between the internal combustion engine and a rotor drive means, said override clutch means being operable to disconnect the drive connection means as soon as the output rotational speed of the override clutch means which is identical with the rotor drive rotational speed is higher than the input rotational speed which is proportional to the internal combustion engine rotational speed, separate first and second starter means for the rotor drive means and the internal combustion engine, and further means operable in a first phase of a starting operation to initially accelerate the rotor drive means by means of the first starter means to a synchronous rotational speed and upon reaching the synchronous rotational speed in a subsequent second phase, for starting the internal combustion engine by means of the second starter means, and the internal combustion engine taking over the drive of the rotor as soon as its rotational speed exceeds a value at which the override clutch means establishes the power connection between the internal combustion engine and the rotor drive means.

4,875,644

ELECTRO-REPULSIVE SEPARATION SYSTEM FOR DEICING

Lowell J. Adams, North Canton; Steven C. Simshauser, Akron; Nathan Pisarski, Stow, and Norbert A. Weisend, Jr., Cuyahoga Falls, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 14, 1988, Ser. No. 258,279

Int. Cl.[4] B64D 15/00

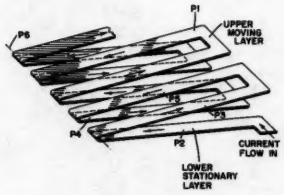
U.S. Cl. 244—134 R 75 Claims

1. Deicing apparatus comprising a first sheet-like array of a plurality of first electrically conductive members electrically insulated from one another in parallel spaced-apart relationship,

and a second sheet-like array of a plurality of second electrically conductive members electrically insulated from one another in parallel spaced-apart relationship,

said electrically conductive members being electrically interconnected so that any electrical current flowing in the electrically conductive members flows in the same direction in adjacent first electrically conductive members and also flows in adjacent second electrically conductive

members in a direction opposite to the flow in said first electrically conductive members, thereby producing an electroexpulsive separation force between said first and second electrically conductive members which produces a separation between said first and second electrically conductive members,



said first sheet-like array being coextensive with and superposed proximate to said second sheet-like array so that said first and second electrically conductive members are substantially parallel.

4,875,645

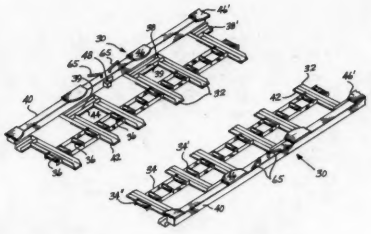
MODULAR CARGO CONVEYOR AND RESTRAINT SYSTEM FOR AIRCRAFT

Jack P. Courter, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Division of Ser. No. 69,518, Jul. 2, 1987, Pat. No. 4,824,050. This application Nov. 14, 1988, Ser. No. 272,128

Int. Cl.[4] B64C *1/20*; B64D *9/00*

U.S. Cl. 244—137.1 **12 Claims**



1. In an aircraft compartment of the type having a floor and a plurality of anchor fittings mounted in the floor, a cargo conveyor and restraint system comprising a plurality of sections each of which includes a plurality of laterally extending, longitudinally aligned bearing beams for distributing cargo loads over the floor; a plurality of roller trays secured to and extending longitudinally between the bearing beams; at least one tie-down support beam laterally offset from the roller trays and secured to and extending longitudinally between adjacent bearing beams, said support beam including means for securing the section to the anchor fittings; and restraint means for restraining horizontal and vertical movement of cargo units positioned on the section.

4,875,646

AIRCRAFT NAVIGATION SYSTEMS

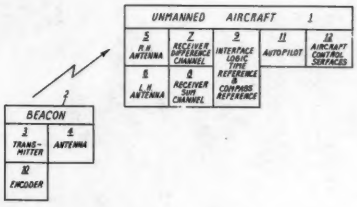
Nigel Browning, Uckfield; Arthur C. Fry, Woking; Robert L. H. Malpass, Ashford; Brian Matthews, Frimley Green, and Michaels S. Peters, Finchampstead, all of England, assignors to British Aerospace Public Limited Company, London, England

Filed Jul. 17, 1978, Ser. No. 926,975

Claims priority, application United Kingdom, Jul. 23, 1977, 31044

Int. Cl.[4] B64C *13/20*

U.S. Cl. 244—190 **17 Claims**



1. A navigation system for an aircraft fitted with an autopilot, the system comprising:

at least one ground-based transmitter transmitting a first signal;

receiver means for receiving the first signal, the receiver means being mounted in the aircraft and including two antennae oriented such that their polar diagrams overlap and are inclined with respect to the fore-and-aft axis of the aircraft;

means for deriving an error signal and a distance signal from the signals generated by the antennae in response to the first signal from the transmitter, the error signal being indicative of an angular difference between a heading of the aircraft and a heading of the transmitter relative to the aircraft, the error signal also being applicable to the autopilot to align the heading of the aircraft with the heading of the transmitter, the distance signal being representative of a distance of the aircraft from the transmitter and being derived by a summing device which sums amplitudes of the signals generated by the two antennae, the amplitudes being an indication of the distance between the aircraft and the transmitter; and

means responsive to the distance signal for initiating a turn maneuver of the aircraft such that the aircraft will continually fly back and forth over the transmitter, the turn-initiating means being a threshold device initiating a turn of the aircraft by generating a turn command signal to the autopilot when the distance signal falls below a predetermined value.

4,875,647

CABLE TIE

Akira Takagi; Hirotsugu Oyaizu; Nobuatsu Takahashi, and Kiyotaka Kume, all of Okazaki, Japan, assignors to Daiwa Kasei Kogyo Kabushiki Kaisha, Okazaki, Japan

Filed Apr. 21, 1988, Ser. No. 184,586

Claims priority, application Japan, Apr. 24, 1987, 62-63330[U]; Apr. 24, 1987, 62-63331[U]; May 28, 1987, 62-81787[U]

Int. Cl.[4] F16L *3/08*

U.S. Cl. 248—74.3 **6 Claims**

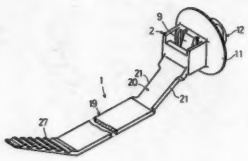
1. A cable tie adapted to be tightened around a bundle of wires or the like by a tensioning device and fixed to a tie mounting hole of a vehicle body or the like, said cable comprising:

a longitudinally elongate strap having opposed surfaces, said strap being flexible and of a substantially fixed length, a

series of teeth formed on and extending longitudinally on one surface thereof;

said strap having a longitudinally elongate linearly extending band portion with opposed first and second ends, a strap connecting portion integral with said band portion at said first end, and a strap leading end portion integral with said band portion at said second end;

a buckle integrally connected to said strap connecting portion remote from said band portion, said buckle having means defining an aperture therethrough generally perpendicular to the longitudinal extent of said strap for receiving said strap, a pawl disposed within said aperture



and adapted to engage one of said teeth of said strap when said strap is looped around a bundle, and a locking leg integrally connected to said buckle and extending in a direction opposite to the direction in which said strap extends for engagement within a mounting hole;

the improvement wherein, when said cable tie is in a relaxed state prior to engagement around a bundle, said strap connecting portion extends longitudinally beyond and at an angle laterally relative to the longitudinal extent of said strap band portion with said buckle positioned at a predetermined location spaced both laterally and longitudinally from said strap band portion by said connecting portion.

4,875,648

ASSEMBLY COMPRISING ROLLING MEANS AND SLIDEWAYS, AND LIGHTING APPARATUS COMPRISING SUCH AN ASSEMBLY

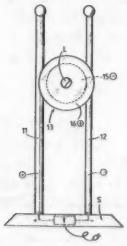
Manuel Guarnori, Chene-Bourg, Switzerland, assignor to Roland Racine, Thonex, Switzerland

Filed Apr. 1, 1988, Ser. No. 176,745

Claims priority, application Switzerland, Apr. 1, 1987, 1243/87

Int. Cl.[4] A47G *29/00*

U.S. Cl. 248—125 **1 Claim**



1. Assembly comprising rolling means and two parallel guiding slideways, characterized by the fact that the slideways are constituted by elements of which at least the confronting external walls are cylindrical, the radius of the cylindrical wall of one of these elements being greater than that of the other, and by the fact that the rolling device comprises a rotation axle perpendicular to the plane of the two slideways and mounted for movement in parallelism thereto, a central roller freely rotatably mounted on said axle and whose diameter is such that it will be in rolling contact with the slideway having the cylindrical wall of smaller radius, but out of contact with the other slideway, and two outer rollers mounted freely rotatably on said axle on each side of the central roller, and whose peripheral internal surface has a concave groove in rolling contact with the slideway having the cylindrical wall of greater radius but out of contact with the other slideway.

4,875,649

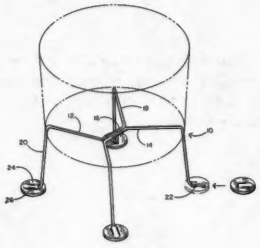
SUPPORT STAND

Robert Bendig, Jr., 425 Merrimac, No. D-103, Costa Mesa, Calif. 92626

Filed Jul. 18, 1988, Ser. No. 220,173

Int. Cl.[4] A47G *23/02*

U.S. Cl. 248—153 **7 Claims**



1. A support stand comprising:

a pair of rigid wires, each such wire bent to form the top and sides of a horizontally disposed trapezoid, the trapezoid sides extending integrally into respective generally vertical legs, the respective trapezoid tops of said wires being affixed to each other to form a unitary member having a stable elevated support surface, wherein said affixed trapezoid tops form a centrally located portion of said elevated surface and said trapezoid sides form a plurality of diagonal portions of said elevated surface, each such diagonal portion extending radially from said centrally located portion.

4,875,650

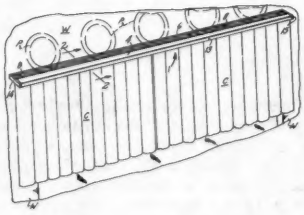
CURTAIN SUPPORTING BRACKET

Jeffrey W. Goodell, 12375 Mount Jefferson Terrace, Apt. #10-G, Lake Oswego, Oreg. 97035

Filed Jun. 27, 1988, Ser. No. 211,854

Int. Cl.[4] A47H *1/10*

U.S. Cl. 248—261 **2 Claims**



1. A curtain supporting bracket of horizontally elongate shape for lengthwise wall attachment above a window, said bracket having a rear wall extending horizontally the length of the bracket for surfacial abutment with a room wall, a top wall, an inclined surface coterminous with the top wall and partially defining a recess extending the length of the bracket, said

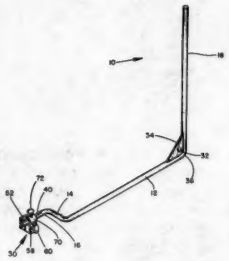
inclined surface adapted to be bored at intervals therealong to receive wall penetrating fasteners for anchoring the bracket to the room wall, said bracket having a bottom wall defining a lengthwise disposed recessed area extending the length of the bracket for the concealed reception of a curtain supporting track.

4,875,651

TRANSDUCER MOUNTING DEVICE

Dennis D. Wergin, and Antone L. Wergin, both of 3955 W. Arby Ave., Las Vegas, Nev. 89118

Filed Dec. 6, 1988, Ser. No. 280,668
Int. Cl.[4] E04G *3/00*
U.S. Cl. 248—286 **15 Claims**



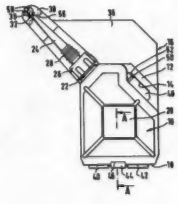
1. A transducer mounting device comprising a bar including:
(a) a horizontal arm portion,
(b) a vertical arm portion integrally joined to a first end of the horizontal arm portion,
(c) a horizontal offset member integrally joined to a second end of the horizontal arm portion,
(d) a horizontal extension finger integrally joined to the offset member and generally coplanar therewith, and
(e) bracket means for rotatably securing the extension finger to the frame of an operating table.

4,875,652

OIL SQUIRT WITH WALL HOLDER

Gerhard R. Bosse, Waldweg 11, 2000 Oststeinbek 2; Michael Lienow, Jahnstrasse 64, 2085 Quickborn; Bernt Spiegel, Saarburger Ring 10 - 12, 6800 Mannheim 71, and Bernd O. Kruse, Ludwigsteinstr. 63, 3430 Witzenhausen 6, all of Fed. Rep. of Germany

Filed Feb. 22, 1989, Ser. No. 313,494
Claims priority, application Fed. Rep. of Germany, Feb. 29, 1988, 8802650; Oct. 26, 1988, 8813422
Int. Cl.[4] B65D *25/00*; B67D *5/00*; F01M *11/00*
U.S. Cl. 248—311.2 **10 Claims**



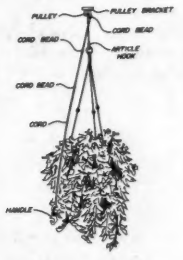
1. An oil squirt mountable, in a predetermined supporting position, to a wall holder and provided with a flexibly bendable nose, characterized in that provided on the wall holder (16) at the point (at 38) where the nose tip (24) is located in the supporting position of the oil squirt (10), is a closure cap (38,54;64) sealing the nose tip (24) of the oil squirt (10), from which cap the nose tip (24) is withdrawable when removing the oil squirt (10) from the wall holder (16).

4,875,653

SUPPORT SYSTEMS AND APPARATUS FOR SUSPENDING AND RESUSPENDING ARTICLES AT SELECTED HEIGHT POSITIONS

Donald P. Connolly, 4590 Kensington Rd., Milford, Mich. 48042

Filed Oct. 19, 1988, Ser. No. 260,014
Int. Cl.[4] B66D *1/36*
U.S. Cl. 248—332 **18 Claims**



1. In an article suspension system, an article hook for raising, lowering and suspending an article on a cord at selected positions of static and dynamic suspension, said system including a pulley comprising a pulley wheel and a pulley holder, and a cord having first and second opposed ends joining and extending between the hook and a handle and being adapted to be hung in a first position of static suspension over the top of the pulley with one cord section reaching therebelow to the article hook for holding an article suspended by the hook and with another cord section reaching therebelow in suspension to the handle by means of which handle the suspended article can be raised and lowered with respect to the pulley wheel,

said article hook having a generally planar C-shape terminating in vertically spaced apart upper and lower C-end hook portions, said lower C-end hook portion being adapted for hanging said article thereon,

said handle comprising a handle hook and said upper C-end article hook portion being configured as a proximal hook attached to the handle hook in depending hooking relation therewith for the purpose of maintaining an article in static suspension.

4,875,654

MAGNETIC PICTURE RETAINER

Michel Chandonnet, and Luc Chandonnet, both of Ste Foy, Canada, assignors to Yvon Chandoneet, Terrebonne, Canada

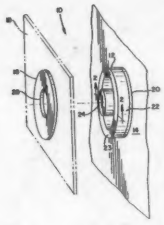
Filed Dec. 29, 1987, Ser. No. 139,011
Int. Cl.[4] A47F *7/14*
U.S. Cl. 248—467 **4 Claims**

1. A device for mounting a picture on a supporting structure, said device comprising: first and second magnetically attracting members, said first member being adapted to be mounted to said supporting structure and said second member being adapted to be mounted to said picture, wherein said first member includes:

a back-plate adapted to be mounted to said supporting structure;

a permanent magnet having an annular shape;

a centrally located pin extending slightly beyond the frontal face of said permanent magnet; and



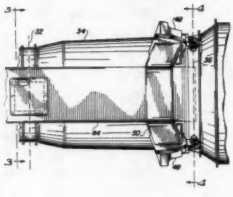
said second member having a seat adapted to receive said pin when said members are engaged for preventing said members from sliding relative to each other.

4,875,655

VIBRATION ISOLATING ENGINE MOUNT

Stanley I. Bender; Lawrence Butler, both of Cincinnati, and Peter W. Dawes, Madeira, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Mar. 13, 1987, Ser. No. 25,541
Int. Cl.[4] B64D *27/18*
U.S. Cl. 248—557 7 Claims



1. An aircraft engine suspension system for mounting an engine to a supporting frame by mounts arranged in first and second parallel spaced mounting planes transverse to a longitudinal axis of the engine, the supporting frame being parallel to the engine axis, said suspension system comprising:

(a) first and second circumferentially displaced vibration isolation mounts positioned in the second mounting plane and coupling the engine to the supporting frame, each of said first and second mounts being oriented for providing radial and axial stiffness and vibration damping between the engine and supporting frame without tangential support over a predetermined range of circumferential motion of the engine; and

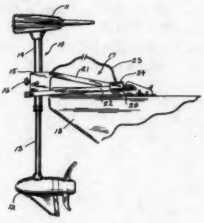
(b) a third vibration isolation mount positioned in the first mounting plane and coupling the engine to the supporting frame, said third mount being oriented for providing radial and tangential stiffness and vibration damping between the engine and supporting frame without axial support over a predetermined range of axial motion of the engine, each of said first, second and third mounts providing support forces vectorially resolvable into mutually perpendicular vector forces such that the suspension system is statically and dynamically determinant.

4,875,656

STOWABLE PULL HANDLE FOR ELECTRIC TROLLING MOTOR SUPPORT APPARATUS

Robert H. Boede, Omro, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jun. 30, 1988, Ser. No. 213,692
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—642 6 Claims



1. In a deck mounted electric trolling motor including a pivotal motor support apparatus mounting the motor for movement between an operative position and a horizontal stowed position on the deck, the support apparatus including a support base attached to the deck, pivot arms pivotally interconnecting the motor and the base, and an operating cord attached at one end to the pivotal interconnection between the motor and the pivot arms to facilitate manual lowering of the motor to its operative position and retraction of the motor to its stowed positon, an improved operating cord handle comprising:

a manually engageable body;

said operating cord attached at its other end to the body; and,

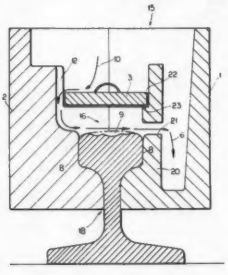
a slot in the body receiving and frictionally engaging the edge of one of said pivot arms and demountably securing the handle to said arm in a fixed position in either the operative or stowed position of the motor.

4,875,657

RAIL REPAIRING METHOD AND APPARATUS

Ronald H. Moller, and Alan K. Batty, both of New South Wales, Australia, assignors to Thermit Australia Pty. Limited, New South Wales, Australia

Filed May 27, 1988, Ser. No. 199,663
Claims priority, application Australia, May 28, 1987, PI 2197
Int. Cl.[4] B22D *19/10*
U.S. Cl. 249—86 6 Claims



1. A mould to aid in the repair of a rail head of a rail, said mould including a pair of mould parts to be removably applied to the rail head so as to generally surround a damaged portion

of the rail head, said mould pair co-operating to define a cavity extending through the mould and within which the damaged portion is located, said cavity extending between a pair of side openings and including a bottom opening generally closed by the rail, and dam means defining an upper limit of the cavity to determine the quantity of molten metal that may be retained within the cavity together with said rail head, with excess molten metal being allowed to pass over said dam means.

4,875,658

ELECTROMAGNETIC VALVE

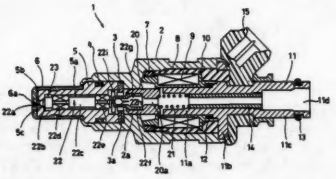
Yoshiro Asai, Kyoto, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1987, Ser. No. 106,612

Claims priority, application Japan, Oct. 8, 1986, 61-0238086; Oct. 8, 1986, 61-0238087

Int. Cl.[4] F16K *31/06*

U.S. Cl. 129.21 **13 Claims**



1. An electromagnetic valve which is disposed in a fluid passage to open or close said passage, said valve comprising:

a housing;

a solenoid disposed in said housing;

a guide member disposed in said housing and having a guide hole;

a plunger disposed between said solenoid and said guide member and responsive to energization of said solenoid; and

a valve member, slidably fitted in said guide hole of said guide member and coupled to said plunger, for opening and closing said fluid passage in accordance with an energization state of said solenoid;

said plunger being made of a magnetic material, and of said guide member and said valve member, at least said valve member being made of a non-magnetic high-magnesium austenitic steel containing 7.8% to 24.5% manganese and having an outer surface thereof subjected to a plasma nitriding process.

4,875,659

SERVO-VALVE

Carl H. Häfele, Werner-von-Siemens-Strasse, 4052 Korschenbroich 1, and Manfred Weyand, Korschenbroich, both of Fed. Rep. of Germany, assignors to Sempell Aktiengesellschaft and Carl Heinz Häfele, both of, Fed. Rep. of Germany

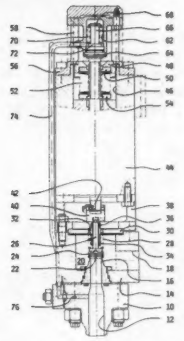
Filed Sep. 13, 1988, Ser. No. 243,847

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1987, 3731664

Int. Cl.[4] F16K *39/02*

U.S. Cl. 251—282 **8 Claims**

1. A servo-valve for use in steam systems with a housing in which a valve seat is formed between an intake and an outlet, with a seal supported by a valve steam and cooperating with the valve seat, and with a servomotor acting on the valve stem, wherein a compensating motor is connected to an end section of the valve stem lying at a distance from the seal, the working space of said compensating motor being connected to the valve intake and its active pressure-loaded area being selected, in relation to the active area of the seal defined by the valve seat, in such a way that the force produced by the compensating motor is opposed to the existing force exerted on the seal by the low medium, and is in terms of magnitude preferably equal to or only slightly smaller or greater than the latter force, and



wherein the working space of the compensating motor is connected to the valve intake by a condensate tube.

4,875,660

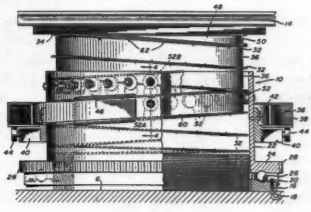
PUSH ACTUATOR

Pierre Gagnon, 5637 Wilderton Avenue, Montreal, Canada H3T 1S1, and Pierre Laforest, 1945 de Bruxelles Street, Montreal, Canada H1L 5Z5

Continuation-in-part of Ser. No. 151,650, Feb. 2, 1988, abandoned. This application Feb. 6, 1989, Ser. No. 306,410

Int. Cl.[4] B66F *3/08*

U.S. Cl. 254—1 **17 Claims**



1. A telescopic tube comprising a first annular band wound in helical form about a central axis with its turns transversely normal to said central axis and capable of taking a retracted stacked position with its turns resting flat against one another, and an extended position with its turns spaced from one another in the direction of said central axis, a second band wound on itself, with its turns transversely parallel to said central axis, and capable of taking a retracted, spiral position with its turns nested within one another and an extended position with its turns forming a helix around said central axis and generally equally radially spaced therefrom to form a tube, said first and second bands, when in retracted position, in respective locations so as to clear each other, spacer means to successively space the turns of said first band, driving means to cause relative rotation of said first band and of said spacer means about said central axis, and guide means to insert the turns of the second band between the spaced turns of the first band, with the edges of the turns of the second band bearing against the turns of the first band, the second band thus forming a spacer for the turns of the first band.

4,875,661

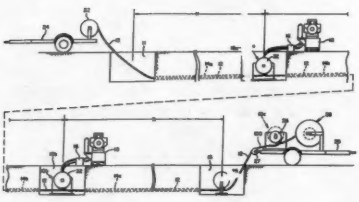
METHOD FOR PULLING MULTIPLE RUNS OF FIBER OPTIC CABLE

Ralph C. Langston, 13588 SE. 152nd Ave., Clackamas, Oreg. 97015

Continuation-in-part of Ser. No. 56,490, Jun. 1, 1987, Pat. No. 4,757,976, which is a continuation-in-part of Ser. No. 818,117, Jan. 10, 1986, Pat. No. 4,699,705, which is a division of Ser. No. 648,757, Sep. 7, 1984, Pat. No. 4,576,362. This application Jul. 18, 1988, Ser. No. 220,699

Int. Cl.[4] H02G *1/08*

U.S. Cl. 254—134.3 FT 20 Claims



1. A method for installing multiple long runs of fiber optic cable in a common conduit having an entry at one end and an exit at an opposite end, the method comprising:

providing at least one intermediate access point spaced between the entrance and exit to divide the length of the conduit into segments, each segment having a length such that a pulling tension applied to each cable sufficient to pull the cable through each conduit segment is less than a predetermined tension at which the fiber optic cable could be damaged;

placing at least two continuous long runs of fiber optic cable at the conduit entry;

placing an intermediate capstan winch at each intermediate access point and an end pulling winch at the conduit exit, for pulling the cable through each segment of the conduit, the capstan winch including a flanged capstan wheel having a circumferential cable engagement surface;

extending a pull rope from the conduit entry through the conduit via the intermediate access point to the conduit exit;

connecting one end of the pull rope to a lead end of each of the fiber optic cables and an opposite end thereof to the end pulling winch;

winding at least one wrap of an intermediate portion of the pull rope around the capstan wheel at the intermediate access point; and

simultaneously operating each winch to pull the rope and thereby the cables through the conduit;

the cables and capstan wheels being mutually sized so that the circumferential cable engagement surface has a width that exceeds the product of the number of cables times the diameter of the cables times the number of wraps of the pull rope by a predetermined margin so that the cables can wrap simultaneously a predetermined number of times around each capstan wheel without overlapping as the cables pass each intermediate access point.

4,875,662

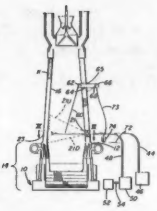
METHOD AND APPARATUS FOR RELINING BLAST FURNACE

James D. Head; Edward F. Burns; William A. Schleizer, all of Valparaiso; C. Douglas White, Chesterton, and Dennis L. Gentry, Cedar Lake, all of Ind., assignors to BMI, Inc., Carnegie, Pa.

Division of Ser. No. 924,405, Oct. 29, 1986, Pat. No. 4,793,595. This application Oct. 28, 1988, Ser. No. 266,371

Int. Cl.[4] C21B *13/00, 15/00*

U.S. Cl. 266—44 24 Claims



1. A method of spraying material upon at least a portion, that requires spraying, of a wall of a refractory body extending upward from a mantle and having a plurality of circumferentially spaced windows extending through said wall at a level above said mantle, each said window being opposite a different portion of said interior surface, said method comprising:

selecting one of said plurality of circumferentially spaced windows, said selected window having a sill,

extending an elongated pipe through said selected window into the interior of said refractory body with the interior open end of said elongated pipe facing a part of said portion of said interior surface opposite said selected window and an exterior portion of said pipe extending outside said refractory body,

pivotally supporting said pipe relative to said sill of said selected window to allow said pipe to pivot about two angularly related axes normal to the length of said pipe where said pipe intersects said sill of said selected window,

supplying material to be sprayed to said exterior portion of said pipe,

applying air under pressure to said exterior portion of said pipe to propel said material to be sprayed through said pipe open end in a direction generally perpendicular to a first part of said portion of said interior surface to impinge on a first part of said portion of said interior surface facing said interior open end of said pipe, and

pivoting said pipe about at least one of said angularly related axes while continuing said supplying and applying steps to propel said material onto a different part of said portion of said interior surface in a direction generally perpendicular to a first part of said portion of said interior surface and adjacent to said first part until said parts of said portion that require spraying are sprayed.

4,875,663

CLOSURE DEVICE WITH CLEANING OF A POURING HOLE

Guy Forestier, Saint-Rambert, France, assignor to Clecim, Courbevoie, France

Filed Jun. 13, 1988, Ser. No. 205,886

Claims priority, application France, Jun. 11, 1987, 87 08157

Int. Cl.[4] F27B *03/08*

U.S. Cl. 266—272 10 Claims

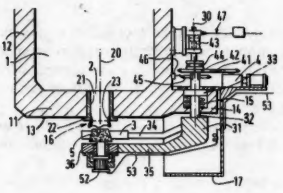
1. Device for cleaning and closing a pouring hole (2) having a vertical axis (20), said pouring hole being provided in a base (11) of a container (1) containing molten metal, said pouring hole being delimited by a refractory cladding (21) a periphery

of which forms a seating (22) on a lower surface (13) of said base (11) of said container (1), said molten metal forming, after pouring, a solidified residue extending on a periphery of said seating (22), said cleaning and closing device comprising

(a) a maneuvering arm (31) mounted for rotation about an axis (30) parallel to said vertical axis (2) of said pouring hole and comprising first and second branches (34, 35) extending radially from said axis of rotation (30) and having the same length;

(b) a closure flap (3) mounted at a free end of said first branch (34) of said maneuvering arm and a cleaning member (5) mounted at a free end of said second branch (35) of said maneuvering arm;

(c) means (4) for rotating said maneuvering arm (31) about its vertical axis for controlling horizontal displacement of said closure flap (3) and of said cleaning member (5) from a stand-by position along a trajectory passing through said axis (20) of said pouring hole (2) to a lower maneuvering level below that of said base (11) and for stopping said maneuvering arm in two different angular positions, respectively a cleaning position in which said cleaning members are centered on said axis of said pouring hole (2) and a closing position in which said closure flap (3) is centered on said axis of said pouring hole (2); and



(d) lowering means (43) and raising means (15) for controlling vertical displacement of said maneuvering arm (31) and for determining positioning of said arm (31) at a lower maneuvering level, an adjustable intermediate cleaning level, and an upper closing level, respectively;

(e) said rotating means (4) and said means for controlling vertical displacement (43, 15) of said maneuvering arm (31) being associated for determining successively:

(i) rotation of said maneuvering arm (31) at said lower level and stoppage of said arm in said cleaning position;

(ii) raising of said cleaning member at said adjustable intermediate level for removing said residue and cleaning said seating;

(iii) returning of said arm (31) to said lower level and the rotation and stoppage of said arm (31) in said closing position; and

(iv) raising of said closure flap to said upper level to apply it to said seating (22).

4,875,664

VIBRATION ATTENUATION

Alan F. Moore, Burbage, England, assignor to Dunlop Limited a British Company, United Kingdom

Filed Mar. 31, 1987, Ser. No. 32,505

Claims priority, application United Kingdom, Apr. 4, 1986, 86 08259

Int. Cl.[4] F16F *9/08, 9/43*

U.S. Cl. 267—140.1 **12 Claims**

1. An anti-vibration mounting comprising:

a rigid fluid container having an opening:

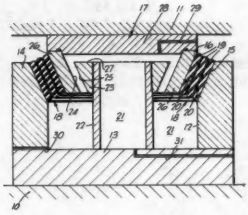
a rigid support member for closing at least a part of said opening;

confronting surfaces defined respectively by said container and support member;

elastomeric bearing means arranged to accommodate relative movement of the fluid container and support member in a direction towards and away from one another and relative movement in a plane perpendicular to said direction;

said elastomeric bearing means comprising at least one element of elastomeric material arranged as flexible seal means to extend between said confronting surfaces of the fluid container and rigid support member thereby to form a fluid chamber within the anti-vibration mounting;

said fluid chamber containing in part a quantity of liquid and in part a quantity of gas;



fail-safe retention means provided within said chamber and arranged to prevent undue relative separation of the fluid container and rigid support member;

liquid supply means for the flow of liquid to and from said chamber, and

gas supply means for the flow of gas to and from said chamber, said liquid and gas supply means being independent of one another whereby the quantities of said liquid and gas within the chamber may be varied independently by flow through said supply means.

4,875,665

ACCUMULATOR

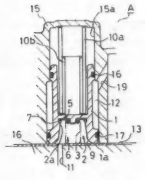
Eiji Kato, Kariya; Masanori Kadotani; Yoshikazu Sakaguchi, both of Anjo; Seitoku Kubo; Kunihiro Iwatsuki, both of Toyota; Hiroji Taniguchi, Toyota, and Yoshihara Harada, Toyota, all of Japan, assignors to Aisin AW Co. Ltd., Anjo and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed May 20, 1988, Ser. No. 196,417

Claims priority, application Japan, Jul. 28, 1987, 62-188521

Int. Cl.[4] F15B *1/053;* **F16L** *55/04*

U.S. Cl. 267—170 **7 Claims**



1. An accumulator comprising:

a cylinder,

pressing means situated in the cylinder,

a piston slidably situated inside the cylinder, said pressing means being located at one side of the piston to urge the piston outwardly, said piston having a hole at a side opposite to the pressing means, said hole having an opening, a large diameter section at a bottom of the hole, a small diameter section adjacent the large diameter section, and a steep tapered surface extending from the small diameter section to the large diameter section so that the diameter of the hole gradually enlarges,

a spring assembly situated in the hole and having a retaining

member to be disposed in the large diameter section and a coil spring fixed to the retaining member at one end thereof, and

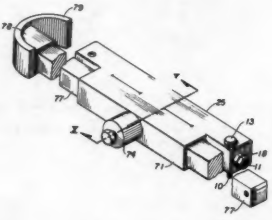
a snap ring having a size larger than the size of the small diameter section of the hole so that when the snap ring is installed in the large diameter section, the snap ring engages the steep tapered surface and expands along the steep tapered surface, expansion force of the snap ring urging the retaining member to be firmly fixed to the bottom of the hole.

4,875,666

CLAMP FOR HOLDING WORK PIECES IN THE FORMATION OF TRUSSES

Leonard P. Hain, P.O. Box 238, Rescue, Calif. 95672

Filed Jun. 30, 1987, Ser. No. 68,021
Int. Cl.[4] B25B *1/10*
U.S. Cl. 269—37 **9 Claims**



1. A clamp device for holding workpieces in the formation of trusses, wherein the workpieces are supported on a substantially horizontal work surface, and wherein the work surface is provided with a plurality of openings, said clamp device comprising:

a body having a guideway formed thereon;

a bar slidably received in the guideway;

means for locking the bar in the guideway in a selected position;

the bar having a first end provided with a workpiece engaging means;

a plurality of keying elements carried on the body and adapted to be received in a corresponding plurality of openings in the work surface, thereby keying the clamp device to the work surface, and at least one of the keying elements being adjustably carried on the body such that the clamp device may be conveniently keyed to a selected plurality of openings in the work surface for clamping versatility, and such that a plurality of clamp devices may rigidly retain the workpieces while the workpieces are joined together;

wherein the means for locking the bar in the guideway comprises:

a cap of substantially annular configuration attached to the guideway;

the cap further having an end wall having a threaded opening therein;

a threaded bolt provided with threads complementary to the pitch of threads in the opening of the cap so that the bolt can be advanced in a direction transverse to the longitudinal axis of the bar;

the cap further supporting a puck having a necked down portion which can frictionally contact the bar with sufficient clearance being provided so that the magnitude of frictional contact of the puck can be adjusted by means of the bolt; and

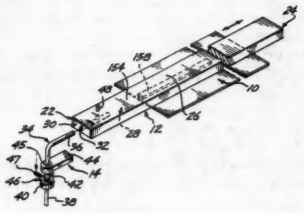
a washer having spring characteristics further being interposed between the bolt and the puck, such that, when locked, the bar remains in place against usual forces applied from any direction.

4,875,667

APPARATUS FOR CLAMPING A TEMPLATE TO A WORKPIECE

Randal D. Schafer, 15713-35th Ave. West, Lynnwood, Wash. 98037

Filed Feb. 1, 1988, Ser. No. 150,772
Int. Cl.[4] B23Q *3/02*
U.S. Cl. 269—91 **6 Claims**



1. An apparatus for clamping templates or the like to a work surface of a support member, the support member having a lower surface opposed to the work surface and an edge extending between the work surface and the lower surface, the apparatus comprising:

an elongate bar having a top surface, a first end and a second end, said bottom surface having a planar configuration; and,

bracing means for bracing the first end of the bar on the work surface, the first end of the bar being rigidly attached to the bracing means, said bracing means includes a ledge having a ledge surface shaped so as to engage the lower surface of the support member and adjustment means for varying the distance between the ledge surface and the bottom surface of the bar, such that said distance can be adjusted to be less than the distance between the lower surface at the edge of the support member and the top of the template;

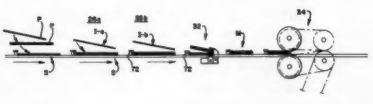
whereby when the apparatus is positioned on the support member on which the template and the workpiece are positioned, the template and the workpiece are between said bar and the work surface, said ledge surface releasably engages said lower surface of said support member and the template and the workpiece can be clamped to the work surface by pushing down on said second end of said bar.

4,875,668

HIGH SPEED SHEET FOLDER AND PRESSER FOR AUTOMATED MAILING SYSTEMS

Rudolf A. Spyra, Tucson, Ariz., assignor to Computer Output Processors and Engineering, Inc., Tucson, Ariz.

Filed Apr. 28, 1988, Ser. No. 187,084
Int. Cl.[4] B42C *1/00*
U.S. Cl. 270—45 **21 Claims**



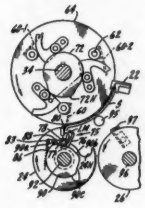
1. A mail processing machine which includes a generally planar table having an upper surface for supportingly engaging the lower surface of the sheets comprising individual mailings to be processed by said machine, a conveyor unit having upper and lower runs disposed beneath said table, a plurality of spaced apart means each extending above said table upper

surface and adapted to engage the trailing edge of an individual mailing comprised of an array of superimposed flat sheets, and an intermittent drive for advancing said engaging means in a given direction so as to move said individual mailings downstream of said machine along the plane of said table, said processing machine further including a folding station having means overlying a portion of said table upper surface and adapted to engage the upper surface upstream portion of said array of sheets, a folder bar extending transversely of said given direction, said folder bar having a surface portion normally lying beneath and engaging a part of the lower surface of the downstream part of said stack, said bar being accurately movable to a position overlying said upstream portion of said array to impart a fold to said array about an imaginary line lying between said trailing edge and the leading edge of said array, a creasing element movable from a position generally coplanar with said upper table surface to a position thereabove to crease said array by engaging its upper and lower surfaces with said creaser element and folder bar respectively, and a pressing roller assembly comprising a pair of opposed pressing rollers having exterior surface portions adapted, in the use of the machine, to engage the respective upper and lower surfaces of said array of sheets passing along said table and through the nip between said rollers, each of said rollers having associated therewith its own drive mechanism, and means for insuring synchronous operation of said drive mechanisms, whereby the peripheral velocity of said rollers comprising said pair is the same, said pair of rollers being movable with respect to each other but normally urged together by resilient means so as to apply a desired degree of pressing force to such array of sheets passing there between.

4,875,669
SIGNATURE GATHERING MACHINES

William B. McCain, Hinsdale, and George D. Higgins, Orland Park, both of Ill., assignors to McCain Manufacturing Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 100,273, Sep. 23, 1987, abandoned. This application Sep. 16, 1988, Ser. No. 246,910
Int. Cl.[4] B65H *39/02*
U.S. Cl. 270—54 **15 Claims**

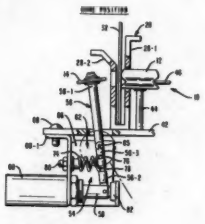


1. Cyclically operable signature gathering machine having a supply station from which folded signatures, each with a folded backbone and two sheets or legs extended therefrom, of which one sheet is longer to present an extended free margin beyond that of the shorter sheet, are to be extracted one by one by capturing the backbone of each by extracting grippers on a cyclically rotating extracting cylinder, said cylinder being defined by at least a pair of spaced discs, whereafter the captured signature is released from the extracting cylinder in the course of one turn and the two legs of the released signature opened respectively by gripper means on a pair of opening cylinders which then in turn release the opened signature to a signature gatherer, characterized by wipers supported by and between said discs for rotary movement cyclically therewith, said wipers being pivotally supported for movement from a retracted position within the perimeter of the discs to an actuated position slightly beyond the perimeter to forcefully displace the free margins of the released signature toward the path of the gripper means of one of the opening cylinders, means to oscillate the wipers, and means cyclically to time oscillation of the wipers so that the wipers are in actuated position to force the free margins of the released signature toward the gripper means on said one of the opening cylinders at the time those gripper means are being presented to the free margins of the released signature.

4,875,670
FLOATING IDLER WHEEL ARM ASSEMBLY FOR A DOCUMENT TRANSPORT

Borge Petersen, Elmira, and William P. Groot, Waterloo, both of Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 17, 1988, Ser. No. 272,602
Int. Cl.[4] B65H *5/06*
U.S. Cl. 271—265 **20 Claims**



1. An assembly for feeding documents comprising:
a frame;
a document track mounted on said frame;
a feed wheel mounted on one side of said document track, and drive means for rotating said feed wheel;
an idler wheel; and
moving means for moving said idler wheel between active and inactive positions with respect to said feed wheel;
said moving means comprising:
an arm having first and second ends and a pivot area therebetween, with said idler wheel being rotatably mounted on said first end;
mounting means for mounting said arm at said pivot area to enable said pivot area to move in opposed directions along a line which is substantially perpendicular to said document track while pivoting on said mounting means;
resilient means for biasing said idler wheel towards said inactive, position; and
an actuator for moving said idler wheel towards said active position against the bias of said resilient means when said actuator is energized.

4,875,671
TRANSPORTING AND SORTING SYSTEM FOR A FLEXIBLE WORKPIECE

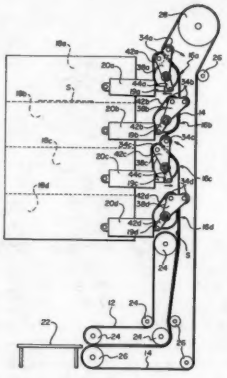
David G. Sherburne, Ontario, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 20, 1988, Ser. No. 197,006
Int. Cl.[4] B65H *29/60, 39/11*
U.S. Cl. 271—302 **5 Claims**

1. Apparatus for distributing a flexible workpiece to a selected holder, the apparatus comprising:
a. flexible first belt means;
b. means for supporting the first belt means in a manner such that the first belt means has a main axis which is aligned generally in a first direction;
c. means for driving said first belt means in said first direction;
d. a plurality of distribution means positioned successively along and adjacent to said first belt means, each distribution means including second belt means for sandwiching a workpiece between the first belt means and the second

belt means for transportation of the workpiece, each distribution means further including means for engaging a portion of the first belt means;

e. moving means associated with each of said distribution means for moving the associated distribution means from a first position, where a main axis of the second belt means is aligned generally in the first direction, to a second position where the main axis of the second belt means is aligned generally in a second direction which leads to an associated holder, the moving means simultaneously causing the engaging means of the associated distribution means to displace the engaged portion of the first belt means toward the associated holder such that a portion of the first belt means is aligned generally in the second direction, whereby a workpiece sandwiched between the



displaced portion of the first belt means and the second belt means can be transported to the associated holder; and

f. means for actuating the moving means associated with a selected distribution means to move said selected distribution means from said first position to said second position in order to transport a workpiece sandwiched between the first belt means and the second belt means of said selected distribution means to a holder associated with said selected distribution means, and for simultaneously actuating moving means associated with another distribution means to synchronously move said other distribution means from the second position to said first position in order to allow displacement of said first belt means by the selected distribution means while maintaining a constant tension on said first belt means.

4,875,672

SWING BOARD TOY

W. Ted Armstrong, P.O. Box 40962, San Francisco, Calif. 94140

Filed Sep. 12, 1988, Ser. No. 242,593

Int. Cl.[4] A63B *23/04;* A63G *1/20*

U.S. Cl. 272—33 R **4 Claims**

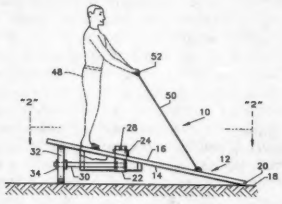
1. A toy for use on a surface comprising:

a. a platform having a first side and a second opposite side;

b. a post extending through said platform to said second side thereof, said post further including means for holding a portion of said post to said second side of said platform, said post being movable relative to said platform;

c. a turnable member, said turnable member bearing on said first side of said platform and being movable thereupon; said platform further contacting the surface;

d. an arm linked to said turnable member and post;



e. means for supporting the user on said second side of said platform.

4,875,673

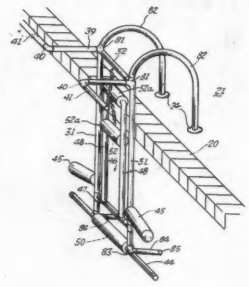
AQUATIC EXERCISE DEVICE

Curtis Erickson, Palm City, Fla., assignor to 501 Hydrosplash Enterprises, Inc., Palm City, Fla.

Filed Nov. 27, 1987, Ser. No. 126,470

Int. Cl.[4] A63B *31/00, 3/00;* E04H *3/18*

U.S. Cl. 272—71 **5 Claims**

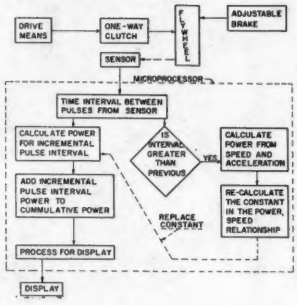


1. An aquatic exercise apparatus for swimming pool use, at least in part below the pool water, comprising main frame means having upper and lower portions, upper supporting means and lower supporting means operatively connected with said main frame means, a first pair of canted arms projecting generally laterally outwards from said main frame means, a second pair of arms projecting generally outward from the uppermost portion of saids main frame means, an exercise platform means pivotally attached to the lower portion of said main frame means, said upper and lower support means, main frame means, first and second pairs of arms and said exercise platform means all provided with internal steel reinforcing means; adjustment means for positioning said exercise platform means in any position from vertical to ninety degrees therefrom said main frame means; said upper supporting means formed integral with and extending from said main frame means in an arcuate configuration and terminating with a pair of legs which are permanently securable to the pool decking.

4,875,674
ENERGY ABSORBING MEANS WITH SELF CALIBRATING MONITOR

Peter D. Dreissigacker, Stowe, and Richard A. Dreissigacker, Morrisville, both of Vt., assignors to Concept II, Inc., Morrisville, Vt.

Continuation-in-part of Ser. No. 14,234, Feb. 12, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 231,679
Int. Cl.[4] A63B *21/22*; G01L *25/00*
U.S. Cl. 272—72 **3 Claims**



1. An energy absorbing means with self calibrating monitor for exercise, comprising:

a frame;

at least one rotating member with a knowm moment of inertia rotatably jounaled in said frame;

brake means for applying variable resistance to said rotating member;

means for driving said rotating member for allowing the human operator to initiate the action of said rotating member by using said drive means;

said drive means is connected to said rotating member by clutch means;

said clutch means has release means to allow said rotating member to be disengaged from said drive means;

means for measuring angular velocity of said rotating member;

calculating means for computing the power dissipation of said brake means by use of a predetermined formula relating power and said angular velocity;

means for periodically calibrating said formula by alternatively calculating the power during the disengagement of said rotating member from said drive means; and

using said alternative calculation to recalibrate said formula.

4,875,675
SKIPPING TOY AND METHOD OF PLAYING SAME

Avi Arad, Westport, Conn., and Melvin R. Kennedy, New York, N.Y., assignors to Tiger Electronics, Inc., Vernon Hills, Ill.

Filed Feb. 28, 1989, Ser. No. 316,860
Int. Cl.[4] A63H *5/20*
U.S. Cl. 272—74 **12 Claims**

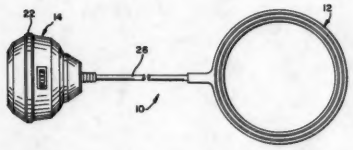
1. A toy adapted to be rotatably swung in a generally horizontal path about a person's ankle, said toy comprising:

a collar adapted to fit around an ankle region of the person playing with the toy;

a drum adapted to engage a ground surface during play;

elongated means for interconnecting said collar and drum, and extending along a generally straight line during play, and permitting said drum to revolve about said generally straight line while the drum contacts a ground surface, said elongated means being of predetermined length and directing said drum in a rotary path about the ankle of the player while simultaneously permitting said drum to revolve about said generally straight line and

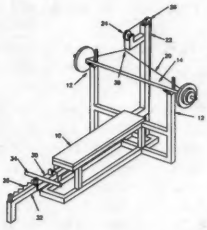
means carried by said drum for counting and visually displaying the number of successive rotations of said toy about the ankle of the player as a function of a predetermined number of revolutions of said drum about said generally straight line.



4,875,676
WEIGHT LIFTING MACHINE FOR SAFE FREE-BAR BENCH PRESS EXERCISING

Karl A. Zimmer, 36652 Chester, Avon, Ohio 44011-1046

Continuation-in-part of Ser. No. 72,675, Apr. 13, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 220,517
Int. Cl.[4] A63B *13/00*
U.S. Cl. 272—123 **12 Claims**



1. An apparatus for training weightlifters in performing the weight-lifting exercise commonly known as the standard bench press, which exercise is correctly executed by an exerciser while in a supine position on a substantially horizontal bench generally supporting the head and torso of the exerciser with his feet resting on the floor, said apparatus comprising means defining a weight-lifting station comprising:

a. a substantially horizontal bench capable of supporting the head and torso of the exerciser;

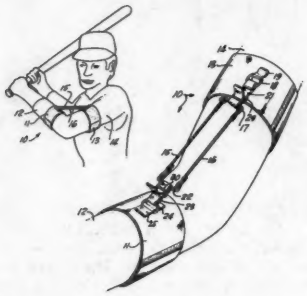
b. a weight bar having selected exercise weights removably attached thereto;

c. a track and a guided sled device captively and slidably mounted on said track and in operative position adjacent the feet of said supine-positioned exerciser and beyond the end of said bench proximal to exerciser's feet, said feet normally resting on the floor to provide balancing support for the exerciser;

d. a flexible elongated connecting means connecting said weight bar through at least one overhead guide means and through other guide means to said sled device;

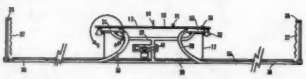
e. and foot-engaging means mounted on said sled device in close proximity to the floor such that said foot engaging means may be engaged at said exerciser's option at any time during exercising use of said apparatus without the need to lift his heels from the floor and thereby to lose said balancing support in effecting such engagement; whereby said weight bar, normally lifted by a pushing force exerted by the arms of said exerciser, may additionally be lifted by a pulling force exerted by said cable, which pulling force is generated by said exerciser's applying a second pushing force on said sled with his feet.

4,875,677
LEAD ARM STRAP FOR BASEBALL HITTERS
Albert G. Tetreault, 1541 Conejo La., Fullerton, Calif. 92632
Filed Aug. 3, 1987, Ser. No. 80,768
Int. Cl.[4] A61B 69/40
U.S. Cl. 273—26 C 6 Claims



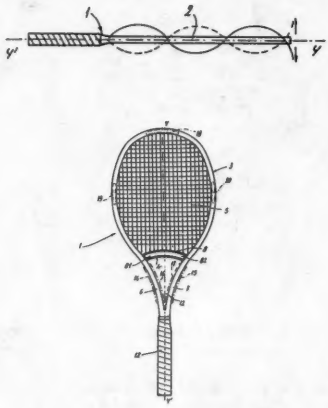
1. A training aid for baseball hitters to assist in keeping a batter's lead arm flexed in a hitting stance, said aid comprising:
a first cuff attached to a batter's lead arm forearm, said cuff having quick connect and disconnect attachment means around the forearm;
a second cuff attached to a batter's lead arm upper arm, said cuff having quick connect and disconnect attachment means around the upper arm; and
elastic strap means affixed between said first cuff and said second cuff by attachment means, said elastic strap means being of a unstretched length and stiffness to hold a batter's lead arm in a generally "L" shaped position when the cuffs are attached around the batter's forearm and upper arm, and when the arm is in a substantially relaxed state but having sufficient elasticity to permit the lead arm to be straightened during a swing without discomfort, said elastic strap means being attached only between that portion of the cuff which is positioned around the inner part of the batter's lead arm so that the lead arm tends to be restrained upon extension.

4,875,678
BALL RETRIEVAL SYSTEM
Hermon R. Sawyer, P.O. Box 60344, Palo Alto, Calif. 94306
Filed Apr. 28, 1988, Ser. No. 187,451
Int. Cl.[4] A63B 61/00
U.S. Cl. 273—30 14 Claims



1. In combination: a table tennis table, a ball receptor positioned near one end of the table, a ball receiving channel extending peripherally around an area in which the table is located, means for conveying table tennis balls along the channel toward a transfer point, and means for conveying table tennis balls from the transfer point to the receptor.

4,875,679
TENNIS RACKET
Pierre A. Movilliat; Yves Piegay, and Gilles D. Gardin, all of Voiron, France, assignors to Societe SKIS ROSSIGNOL S.A., Voiron, France
Filed Dec. 17, 1987, Ser. No. 134,148
Claims priority, application France, Dec. 22, 1986, 86 18458
Int. Cl.[4] A63B 49/02
U.S. Cl. 273—73 R 21 Claims



1. A ball game racket comprising at least one vibration damping element added to the structure of the racket, said vibration damping element positioned locally on the racket on a relatively small surface of the racket and in at least one predetermined zone of the racket;
said element being of the stress plate type associated with a viscoelastic material intended to be shear-stressed and mounted integrally on the outside of the racket
wherein each damping system consists of a plate made of a first material and a second material;
said first material being a viscoelastic material having a damping coefficient of at least 0.5 in a temperature range of from 10° to 30° C. and for frequencies ranging from 0 to 1000 Hz;
said first material glued by vulcanization onto a rigid plate forming said second material;
said second material having a modulus which is very high relative to that of the viscoelastic material;
said plate located at the maximum of the zone of curvature corresponding to one of the three first vibratory modes of bending of the racket.

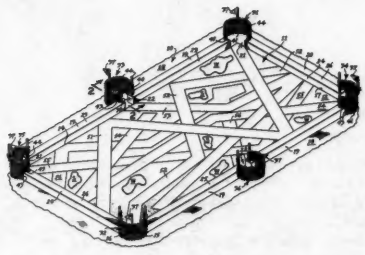
4,875,680
MINIATURE GOLF GAME APPARATUS
Douglas P. Gross, Rte. 1, Box 567, Cross Plains, Tenn. 37049
Filed Aug. 15, 1988, Ser. No. 232,161
Int. Cl.[4] A63F 7/06
U.S. Cl. 273—87 B 4 Claims

1. A miniature golf game apparatus adapted to be played with a movable playing piece and a stick member for propelling the playing piece, in a first mode on a rectangular pool table having marginal bumper rails encompassing a flat table surface and having side and corner pockets, and in a second mode on a flat floor surface, comprising:
(a) a rectangular mat of substantially the same size as the flat table surface of a pool table upon which said mat lies in a flat operative position in a first golf playing mode,
(b) said mat having a playing surface, a back surface, and a marginal edge,

(c) said mat being made of a flexible material sufficient to permit said mat to be coiled from said operative position into a roll in an inoperative position,

(d) a plurality of elongated bumper rails having opposite ends and adapted to extend in spaced end-to-end relationship along said marginal edge to encompass said mat in said flat operative position in a second golf playing mode on a flat floor surface and to define pocket spaces between adjacent ends of said bumper rails,

(e) a pocket member for each pocket space comprising a semi-flexible wall member having opposite end portions adapted to span a corresponding pocket space and having a bottom edge portion resting upon said flat floor surface in said second mode,



(f) securing means for detachably connecting each end portion of said wall member to an adjacent end portion of a corresponding opposed bumper rail to hold said corresponding pocket member in a closed position spanning said corresponding pocket space to retain a movable playing piece in said pocket space,

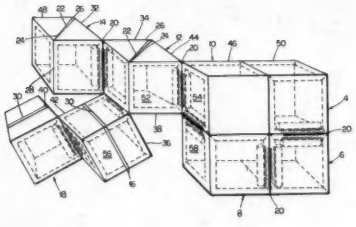
(g) said playing surface comprising a plurality of golf course routes having a starting end portion and an opposite terminal end portion terminating at a corresponding pocket space when said mat and said bumper rails are in their operative positions in said second mode, and terminating in said pockets in said pool table when said mat is in said operative position upon said table surface in said first mode.

4,875,681

HINGEDLY CONNECTED CUBICAL PRISMS AMUSEMENT AND DISPLAY DEVICE

Arie Ofir, 12 Hebron Rd., Jerusalem, Israel 93542

Filed May 26, 1988, Ser. No. 199,029
Claims priority, application Israel, Feb. 29, 1988, 85585
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—155 **11 Claims**



9. An amusement and display device comprising:

a plurality of cubical prism elements including a first, a second, a third, a fourth, a fifth element, and a sixth element, each element having a plurality of edges and faces; and

hinging means for interconnecting the cubical prisms and including:

a. a first hinge connected between an edge of said first element and a first edge of the second element;

b. a second hinge connected between a second edge of said second element and a first edge of said third element, said first and second edges of said second element being disposed along a common face of said second element;

c. a third hinge connected between a second edge of said third element and an edge of said fourth element, said first and second edges of said third element being disposed along different faces;

d. a fourth hinge disposed between a third edge of said second element and a first edge of said fifth element, said third edge being disposed along a different face from said common face of said second element; and

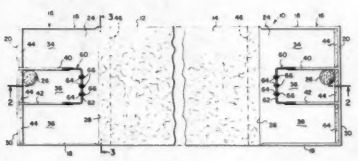
e. a fifth hinge connected between a second edge of said fifth element and a first edge of said sixth element, said first and second edges of said fifth element being disposed along a common face.

4,875,682

PRACTICE PUTTING GAME

Michael Paolillo, 80 Parkview Dr., Searingtown, N.Y. 11040

Filed Nov. 4, 1988, Ser. No. 267,392
Int. Cl.[4] A63B *67/02, 69/36*
U.S. Cl. 273—176 F **12 Claims**



1. A practice putting game comprising:

a rigid base of predetermined width and length having a top putting surface, a bottom surface for contact with a support surface and first and second ends; and

a receptacle contacting each of said first and second ends of the rigid base and having a width generally equal to said predetermined width of said rigid base, each of said receptacles having at least three compartments open toward said respective first and second ends of said rigid base, a said receptacle having a top surface adjacent to said top putting surface of said rigid base.

4,875,683

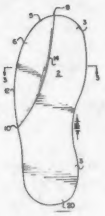
GOLF CLUB SWING IMPROVEMENT APPARATUS

Edward F. Wellman, 3920 Ellsworth Ave., and Francis J. Michaels, 220 Vivian Dr., both of, Munhall, Pa. 15120

Filed Jul. 12, 1988, Ser. No. 217,634
Int. Cl.[4] A63B *69/36;* A43B *5/00*
U.S. Cl. 273—187 B **6 Claims**

1. Apparatus for improving the golf club swing of a person comprising a member which is adapted to be removably inserted inside a shoe of and underlie the foot of the person which is opposite the direction of the swing of the golf club and which has a perimeter contour which is generally the same shape as the perimeter contour of the foot of the person with only an outer forward portion of said member having an increased cross-sectional thickness to elevate only the outer

forward portion of the foot of the person with said member being constructed of a slightly compressible material to limit



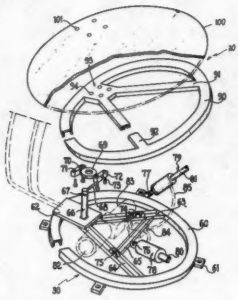
the amount of compression of said member when said member is elevating the outer forward portion of the foot of the person.

4,875,684

ORIENTABLE PLATFORM, IN PARTICULAR FOR TRAINING IN GOLF

Jacques Benilan, 151 Boulevard Haussmann, 75008 Paris, France

Filed Jan. 20, 1988, Ser. No. 146,204
Claims priority, application France, Jan. 20, 1987, 87 00588
Int. Cl.[4] A63B *69/36*
U.S. Cl. 273—195 B **29 Claims**



1. A training or exercising device, in particular for the practice of golf wherein a player practices a golf swing in a swing direction, said device comprising:

a fixed stand;

an orientable platform above said fixed stand for supporting a player, said platform including a movable stand;

support and articulation means between said fixed stand and said platform for defining a point about which the orientation of said platform relative to said fixed stand may be changed by articulation, said support and articulation means comprising a post having a lower part connected to said fixed stand and an upper part and a universal joint interconnecting said upper part of said post and said movable stand;

two actuating jacks, between said fixed stand and said platform, forming means for varying the inclination of said platform about said point relative to said fixed stand;

ball joints connecting said two jacks respectively to said fixed stand and to said movable stand;

said support and articulation means and said two jacks being disposed substantially at respective apices of an equilateral triangle having a center located substantially at the center of said platform; and

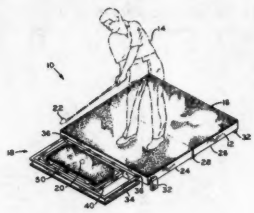
said two jacks being positioned relative to said support and articulation means such that a line extending between said two jacks extends approximately parallel to a direction of swing of a player to stand on said platform and swing at a ball approximately at said support and articulation means.

4,875,685

GOLF PRACTICE APPARATUS

Kedric L. Ballinger, 1337 W. Till Rd., and Robert A. Dornbush, Sr., 1411 Rabus Dr., both of Fort Wayne, Ind. 46825

Filed Apr. 1, 1988, Ser. No. 177,533
Int. Cl.[4] A63B *69/36, 57/00*
U.S. Cl. 273—195 B **17 Claims**



12. A golf practice apparatus for simulating the response of natural turf to the impact of a golf club head during a conventional golf club swing, said apparatus comprising:

a main frame;

an inner frame having a forward end and a rearward end, said inner frame disposed within said main frame, said inner frame carrying an upper surface, the rearward end being pivotally and slidingly connected to said main frame, the forward end being pivotally connected to said main frame via a hinge arm extending downwardly from said inner frame; and

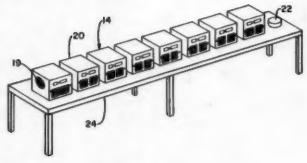
means for biasing said inner frame rearwardly with respect to said main frame such that the rearward end of said inner frame translates forwardly and the forward end of said inner frame translates initially forwardly and then downwardly in a generally arcuate path when the upper surface is impacted by said golf club head.

4,875,686

ELECTRONIC BINGO GAMES SYSTEM NETWORK AND COMPONENTS THEREFOR

Herbert Timms, Caixa Postal 1322 Campinas, Sao Paulo, Brazil 13.100

Filed Nov. 13, 1987, Ser. No. 120,373
Int. Cl.[4] A63F *3/06*
U.S. Cl. 273—237 **8 Claims**



1. An electronic bingo game system network comprising in combination:

a master control station circuit;

table relay station circuits, and

a cashier station circuit,

said station circuits being electronically interconnected, wherein said master control station circuit includes means to sequentially select random bingo game numbers as well as means to transmit signals representing said numbers to said player station circuits through said table station cir-

cuits, and wherein said player table station circuits have electronically programmed visual display means representing bingo cards with uniquely numbered bingo matrices, said player table station circuits also having means to transmit through said table station circuits to said master control station circuit the amount of wagers placed by the insertion of coins or tokens and means to operate controls associated with said player table station circuits, as well as means to indicate the first completion of a pre-determined winning pattern of said selected numbers, said master control station circuit also having means to verify the occurrence of said completions, means wherein said means to indicated the first completion of said winning pattern will automatically be transmitted to said means to verify the occurrence of said completion, to calculate the winnings due therefor on a pyramidal basis, as well as means to determine the status of players' accounts, and means to transmit totals due players to said cashier circuit upon operation of said means to operate controls associated with said player table station circuits by a player.

4,875,687

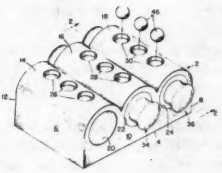
THREE DIMENSIONAL GAME

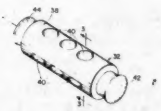
Bruce F. Alsip, Bainbridge Island, Wash., assignor to Alsip & Company, Bainbridge Island, Wash.

Continuation of Ser. No. 183,887, Apr. 20, 1988. This application Oct. 31, 1988, Ser. No. 265,256

Int. Cl.[4] A63F *3/00, 3/06*

U.S. Cl. 273—241 **3 Claims**





1. A game of skill comprising:

a main body portion including a plurality of parallel elongated primary openings therein, each primary opening having a plurality of parallel secondary openings intersecting therewith said secondary openings extending to a common surface of the main body portion,

a plurality of elongated operating elements, one located in eachprimary opening, said operating elements rotatable about their axis within the primary opening and including a plurality of indicia receiving locations, said indicia receiving locations being spaced both axially and circumferentially for selective alignment with the secondary openings whereby indicia may be placed on the operating element during a player's turn and the operating element rotated to mask the indicia during subsequent turns whereby a player must rely upon memory to effectively play the game.

4,875,688

CONVERTIBLE GAME CARRYING CASE

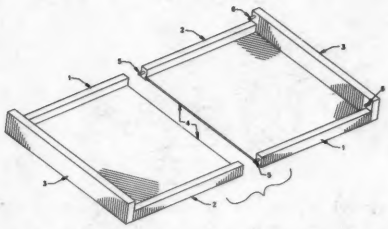
Mark A. Whaley, 1919 Parkers Mill Rd., Lexington, Ky. 40504

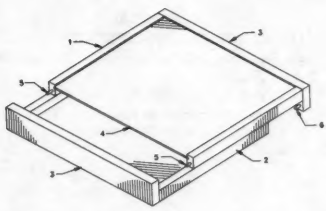
Filed Jan. 22, 1988, Ser. No. 109,918

Int. Cl.[4] A63F *3/00*; B65D *85/20, 6/00*

U.S. Cl. 273—285 **4 Claims**

1. A game board apparatus comprising two identical sections each section comprises a planar member adapted to provide one half of a game board surface, a first wall member mounted to a first side of said planar member, a second wall member mounted to a second side of said planar member opposite said first side, and a third wall member mounted to a third side of said planar member, said first and second wall members being vertically positioned and having the same height above said planar member, said third wall member also being vertically positioned above said planar member and having an extended wall surface substantially exceeding the height of said first or second wall members, said planar members each having a fourth side, and when the two identical sections are oriented





such that the fourth sides of each planar member abut one another and the planar members are coplanar said identical sections form a game board, in combination with first fastening means for securely connecting said sections in the game board position, said game board apparatus being convertible to a game carrying case when the two identical sections are unconnected and oriented such that when the first section is stackably placed on top of the second section, the extended wall surface of the first section abuts the fourth side of the second section planar member and the extended wall surface of the second section abuts the fourth side of the first section planar member simultaneously, and second fastening means for securely connecting said sections in the carrying case position.

4,875,689

BALLS FOR TARGET GAMES

Yuh-Chorng Lin, 902 Chaparral Dr., Walnut, Calif. 91789

Filed Mar. 9, 1989, Ser. No. 321,105

Int. Cl.[4] A63B *65/00*

U.S. Cl. 273—346 **27 Claims**

1. A ball with a first interengaging fabric surface for detachable adherence o a second target interengaging fabric surface, the ball comprising:

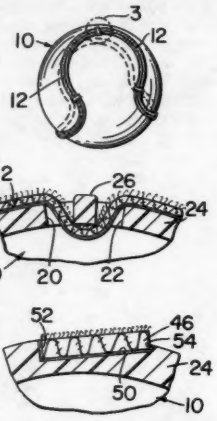
a hollow spherical wall having a radial thickness and a spherical outer surface,

at least one strip of material having thereon the first interengaging fabric surface, attached to the spherical surface of the ball and having at least one curved portion, and

attachment means on the ball for securement of the at least one strip thereto,

said attachment means comprising at least one radially extend-

ing opening in the ball wall, said opening having opposite edge walls and being sized and adapted for extension there-



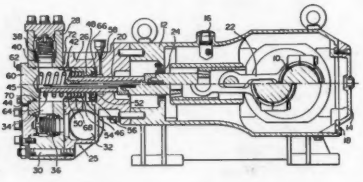
through of portions of the strip for engagement with at least one wall portion to secure the strip to the ball.

4,875,690

SEAL DEVICE FOR RECIPROCATING PUMP

Nobuo Tojo, Mobara, Japan, assignor to Maruyama Mfg. Co. Inc., Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,954
Claims priority, application Japan, Apr. 17, 1987, 62-92972
Int. Cl.[4] F16J *15/18*
U.S. Cl. 277—12 **15 Claims**



1. A sealing device for a reciprocating pump of the type having a pump housing provided with a bore formed therein, said bore having at its one end an opening through which it communicates with the exterior of said pump housing while the other end receives a reciprocating member, said sealing device comprising:

a seal case received within said bore;

a first sealing member positioned on an inner periphery of said seal case and having an inner peripheral surface adapted to be slidingly contacted by an outer peripheral surface of said reciprocating member;

a second sealing member positioned on an inner periphery of said seal case and having an inner peripheral surface adapted to be slidingly contacted by the outer peripheral surface of said reciprocating member and being spaced a predetermined distance from said first sealing member;

a closure removably attached to said pump housing so as to close said opening on said one end of said bore; and

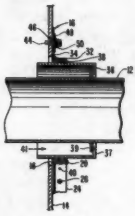
a coiled compression spring loaded between said closure and either one of said seal case and said first sealing member for retaining said seal case and said first sealing member within said bore.

4,875,691

RADIAL SEAL

Cesaar U. Kosi, Garden Grove, Calif., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 5, 1988, Ser. No. 152,726
Int. Cl.[4] F16J *15/00*
U.S. Cl. 277—147 **5 Claims**



1. A radial seal for use in connection with a cylindrical rotatable member passing through a stationary member comprising:

a collar mounted around said rotatable member and spaced therefrom to form a space between said collar and said rotatable member, said collar having an end wall fixedly secured to said rotatable member and said space being sealed at one end thereof by said end wall;

a circular floating shoe surrounding said collar in sealing engagement therewith and mounted to said stationary member;

said shoe comprising a plurality of arcuate segments resiliently connected together around said rotatable member in sealing engagement therewith, said segments being circumferentially spaced apart;

a lap plate mounted at one end of each said segment to overlap an end of an adjacent segment to completely seal the circumferential spaces between adjacent segments; and

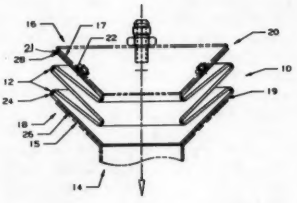
a cable surrounding a substantial portion of said shoe to restrict outward movement thereof.

4,875,692

CONICALLY-SHAPED CORRUGATED SEAL

Michael J. Connor, Wichita, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 20, 1987, Ser. No. 110,431
Int. Cl.[4] F16J *3/04, 15/52;* F16L *51/02*
U.S. Cl. 277—212 FB **13 Claims**



1. A seal for connecting first and second relatively moveable structures and for conducting fluid from said second structure to said first structure, said seal comprising:

a continuous wall having first and second opposed ends and defining an axial conduit, said wall being corrugated axially to define a plurality of circumferential folds, said folds being disposed at an angle to the axis of said conduit and

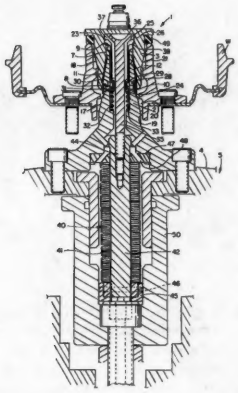
defining at the first end a frustro-conical exterior surface adapted for sealing contact with the first structure and at the second end a frustro-conical interior surface adapted for sealing contact with the second structure, the angle of said folds sloping normally and continuously toward said first end to prevent an accumulation of the fluid in said circumferential folds as the fluid flows from said second structure to said first structure.

4,875,693

ARBOR ASSEMBLY

Ronald R. Nowak, North Royalton, and Carl F. Cherko, Euclid, both of Ohio, assignors to Oerlikon Motch Corporation, Cleveland, Ohio

Filed Aug. 31, 1988, Ser. No. 238,578
Int. Cl.[4] B23B *31/40*
U.S. Cl. 279—2 R **35 Claims**



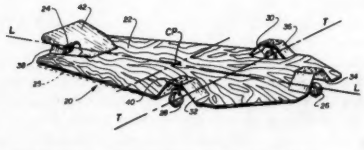
1. An arbor assembly comprising a first arbor section, a second arbor section removably mountable on said first arbor section, said arbor sections having matching sets of longitudinally spaced apart internal and external cylindrical pilot surfaces thereon for concentrically locating said second arbor section on said first arbor section, said pilot surfaces on said arbor sections being spaced apart the same distance so that said pilot surfaces on said arbor sections will start to engage each other at the same time during assembly of said second arbor section on said first arbor section, and means for concentrically locating and clamping a workpiece between said arbor sections.

4,875,694

MECHANICS CREEPER APPARATUS

Jerry O. Hamrick, 4987 Northlawn Dr., San Jose, Calif. 95130

Filed Feb. 11, 1985, Ser. No. 700,530
Int. Cl.[4] B25H *5/00*
U.S. Cl. 280—32.6 **12 Claims**



1. An improved creeper apparatus, comprising:

means forming a generally horizontal platform having a longitudinal support axis and axis of symmetry extending from a head end thereof to a foot end thereof, and a transverse support axis extending across the said longitudinal axis at a point between a central point along the longitudinal axis and said foot end; and

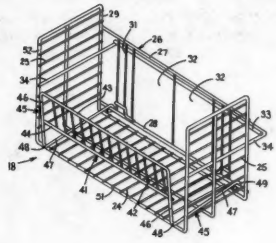
caster means disposed along said longitudinal support axis at said foot end and said head end, and along said transverse support axis at one side and the other side of said platform, whereby said platform may be easily moved in any horizontal direction by the application of corresponding horizontal forces thereto.

4,875,695

CHILD SEAT FOR OVER-THE-COUNTER SHOPPING CART

Ronald L. Badger, Mt. Laurel, N.J., and Michael Pejakovich, Ceresco, Mich., assignors to United Steel & Wire Company, Battle Creek, Mich.

Filed Jun. 8, 1988, Ser. No. 204,187
Int. Cl.[4] B62B *3/08*
U.S. Cl. 280—33.993 **4 Claims**



1. In an over-the-counter shopping cart having a wheel-supported base, an elevated frame positioned upwardly a substantial distance above said base and rigidly joined thereto by an upright structure which joins to said base adjacent the rearward end thereof, an upwardly-opening basket mounted on said elevated frame, said basket having a rear baby seat assembly which includes a bottom wall fixed to said elevated frame and a pair of generally upright side walls projecting upwardly from opposite sides of said bottom wall and a rear wall which projects upwardly from said bottom wall and is rigidly joined between said side walls, said rear wall having a pair of sidewardly-spaced leg-hole openings extending therethrough, said rear wall having a top rod member extending therealong and defining the upper edge thereof, said rear wall also having a lower rod member extending generally parallel with said top rod member and being disposed below said leg openings, the improvement comprising a one-piece unitary back rest arrangement associated with the baby seat assembly, said unitary back rest arrangement being swingably moveable between (1) in use position wherein it functions as a back rest and projects upwardly from the bottom wall in forwardly spaced relationship from said rear wall and (2) a storage position wherein it projects rearwardly over the top of said rear wall, said unitary back rest arrangement including a back rest wall which extends generally transversely between said side walls and has opposite ends thereof rigidly joined to a pair of generally parallel L-shaped support arms which are sidewardly spaced apart and disposed closely adjacent the respective side walls, each said L-shaped support arm including a first cantilevered leg which adjacent its free end is pivotally supported on said lower rod member, said first leg adjacent its forward end being rigidly joined to a second leg which extends approximately perpendicularly with respect to said first leg, said back rest wall being rigidly joined between said second legs and including upper and lower support rods which extend generally parallel with one another and have opposite ends thereof rig-

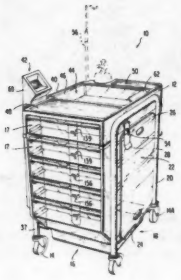
idly joined to said second legs, said lower support rod being spaced upwardly a substantial distance from the point of intersection of said first and second legs so as to be spaced upwardly a substantial distance above the bottom wall when the unitary back rest arrangement is in said use position, said support arms bearing directly against said bottom wall when the unitary back rest arrangement is in said use position so that the back rest wall projects upwardly relative to said bottom wall, said first legs defining a unitary opening which extends transversely therebetween and into and through which objects supported on said bottom wall of said baby basket assembly pass as said unitary back rest arrangement is moved between said use and storage positions, said unitary opening extending substantially from said free ends of said first legs to said forward ends thereof.

4,875,696

CASTER DIRECTION-LOCKING MECHANISM FOR MOBILE CART

Robert J. Welch, Dallas; Albert Kolvites, Mountaintop, and Robert M. White, Conyngham, all of Pa., assignors to Inter-Metro Industries Corporation, Wilkes-Barre, Pa.

Continuation of Ser. No. 901,055, Aug. 26, 1986, abandoned.
This application Sep. 12, 1988, Ser. No. 243,212
Int. Cl.[4] B62B 5/04
U.S. Cl. 280—47.34 21 Claims



1. A cart having a first end and a second end, said cart comprising:

at least three casters supporting said cart for rolling movement, a first two of said casters being adjacent each other and supporting said cart in the region of said first end, and at least one other of said casters supporting said cart in the region of said second end, each said caster including a wheel rotatable about a horizontal axis and being mounted with said cart for swiveling movement about a generally vertical axis;

first locking means selectably operable to lock one of said first two casters against said swiveling movement when said one of first two caster swivels to a first predetermined position relative to said first end of said cart;

second locking means selectably operable, independently of locking of said one caster by said first locking means, to lock the second of said first two casters against swiveling movement when said second caster swivels to a second predetermined position relative to said first end of said cart, with the horizontal axes of said first two casters in generally mutually parallel, substantially collinear relation;

means for interconnecting and simultaneously enabling said first locking means and said second locking means independently to lock said one caster and said second caster when they respectively swivel to said first predetermined position and to said second predetermined position;

handle means, for steering said cart, mounted at said first end; and

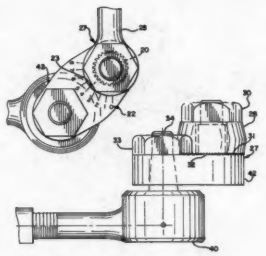
actuator means associated with said handle means for actuating said interconnecting and enabling means thereby operating said first locking means and said second locking means to selectably lock and unlock said one and said second of said first two casters against said swiveling movement.

4,875,697

VARIABLE WHEELBASE LENGTH STEERING LINKAGE

Arden O. Miller, Fort Wayne, Ind., assignor to Navistar International Transportation Corp., Chicago, Ill.

Filed Dec. 2, 1988, Ser. No. 279,486
Int. Cl.[4] B62D 7/16
U.S. Cl. 280—95.1 15 Claims



1. A steering mechanism comprising a steering knuckle assembly adaptable for connection to a wheel spindle including a steering knuckle arm, an adaptor link adjustably connected to said steering knuckle arm to form said steering knuckle assembly, a tie rod pivotly connected to said steering knuckle assembly, indexing means on said link and arm to indicate the positional relationship therebetween for operation with a selected one of a range of vehicle wheelbases.

4,875,698

POWER TRANSMITTING SYSTEM FOR A FOUR-WHEEL DRIVE VEHICLE

Shintaro Uchiyama, Tokorozawa, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 10, 1988, Ser. No. 154,744
Claims priority, application Japan, Feb. 19, 1987, 62-36628
Int. Cl.[4] B60K 17/34
U.S. Cl. 180—233 8 Claims

1. A power transmitting system for a four-wheel drive vehicle having an engine, and a transmission for transmitting power of the engine to main driving wheels of the vehicle, the power transmitting system comprising:

a viscous coupling for transmitting the power therethrough to auxiliary driving wheels of the vehicle;

a lock device provided for locking said viscous coupling to directly transmit the power to the auxiliary driving wheels;

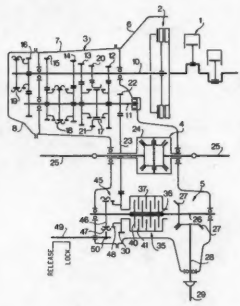
detector means for detecting driving conditions of the vehicle and for producing driving condition signals;

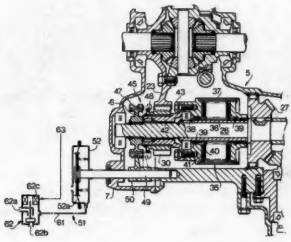
calculator means for calculating driving torque of the power transmitting system based on the driving condition signals;

comparator means for comparing the calculated driving torque with a predetermined driving torque and for producing an output signal when the calculated driving torque exceeds the predetermined driving torque; and

an actuator means responsive to said output signal for operating said lock device to lock the viscous coupling;

said calculator means calculates the driving torque as engine torque multiplied by the gear ratio of the transmission





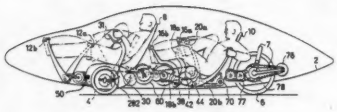
multiplied by a final reduction gear ratio divided by a constant for effective radius of tires.

4,875,699

HUMAN POWERED VEHICLES AND MECHANISMS PARTICULARLY USEFUL THEREIN

Shmuel Levavi, Keren Kayemet L'Yisrael Street 18,, Givatayim, Israel

Division of Ser. No. 809,387, Dec. 16, 1985, Pat. No. 4,708,356. This application Aug. 20, 1987, Ser. No. 87,368
Int. Cl.[4] B62M *9/00, 11/00*
U.S. Cl. 280—236 **24 Claims**



1. A human powered vehicle including a drive comprising foot pedals for propelling said vehicle, said drive further comprising:

a stepped variable transmission including a plurality of gears selectively made operative to vary the transmission in a plurality of distinct steps to provide a selected gear ratio;

a continuously variable transmission continuously variable within a selected gear ratio to provide a selected transmission ratio;

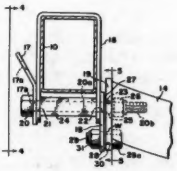
and manual control means for manually controlling both said stepped variable transmission and said continuously variable transmission.

4,875,700

BOAT TRAILERS

George E. Monroe, Pinconning, Mich., assignor to Magline, Inc., Pinconning, Mich.

Filed May 31, 1988, Ser. No. 200,544
Int. Cl.[4] B60D *3/10*
U.S. Cl. 280—414.1 **9 Claims**



1. In a boat trailer frame having a tongue with transversely spaced longitudinal frame members having convergent front portions fixed to said tongue and parallel rear portions; wheels supporting the rear portions for travel behind a towing vehicle; and a cross rail spanning said parallel portions and carrying sets of boat hull engaging members arranged to conform to the shape of the hulls of boats to be transported; the improvement wherein:

a. a longitudinal frame member enveloping hanger is mounted on each longitudinal frame member and is slidable longitudinally thereon when in released condition;

b. cross rail mounting and hanger securing means for mounting the ends of said cross rail and releasably securing said hangers in a longitudinal position;

c. said cross rail mounting and hanger securing means including transversely extending pivot means carried by said hangers and mounting said ends of said cross rail for pivoting movement in a fore and aft direction relative to said hangers and longitudinal frame members;

d. pivot restricting stop means interacts between said hangers and cross rail to limit the arc of fore and aft pivot of said cross rail; and

e. said stop means comprising a plate fixed to the end of each cross rail; a plate secured to each hanger transversely opposite each plate; and projection and slot means interacting between each of said hanger and stop means plates portions to provide only a predetermined arc of travel.

4,875,701

BOAT TRAILER HULL AND KEEL SUPPORTING ASSEMBLY

Byron L. Godbersen, Lake LaJune Estates, Ida Grove, Iowa 51445

Filed Dec. 21, 1988, Ser. No. 287,170
Int. Cl.[4] B60P *3/10*
U.S. Cl. 280—414.1 **5 Claims**

1. Boat hull and keel supporting assembly for use with a boat trailer having a frame including a pair of frame members extended rearwardly from a tongue connection, said supporting means comprising:

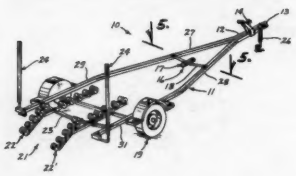
a cross member secured to and extended transversely between the frame members;

hull supporting means mounted on said cross member and extended transversely therebetween;

keel supporting means pivotally mounted on said cross member and extended normal thereto for movement about a transverse axis, said keel supporting means having open-

ings formed therein for removing foreign material from the boat keel engaged thereby;

and further wherein said keel supporting means includes at least one element engageable with the boat keel and having a plurality of longitudinally spaced and aligned slots formed therein, whereby foreign material is removed from the boat keel upon engagement by the said one element, which foreign material falls through the said slots.



4,875,702

METHOD OF PRODUCING SKIS AND SKI

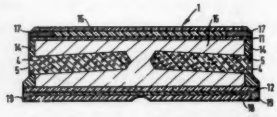
Franz Scherubl, Radstadt, Austria, assignor to Atomic Skifabrik Alois Rohrmoser, Austria

Filed Jul. 13, 1988, Ser. No. 218,651

Claims priority, application Austria, Jul. 23, 1987, 1866/87

Int. Cl.[4] A63C *5/12*

U.S. Cl. 280—602 **16 Claims**



1. A method of providing individualized vibration absorption properties to a mass produced ski in the concluding stages of its production, said ski having a core extending in the longitudinal direction of the ski, a running surface, and side walls; said method comprising the steps of:

manufacturing the ski to its essentially completed state, and thereafter;

introducing bores in the ski extending from at least one side wall into the core, said bores being generally straight and lying at a constant angle of at least 30° to the longitudinal direction of the ski, said bores terminating in one of the core and the opposite side wall of said ski, the extension of the bores in the core being completely surrounded by the core; and

filling the bores with a vibration damping material,

the number and configuration of said bores and the properties of said material providing the individualized vibration absorption properties to the ski.

4,875,703

DOUBLE LINK TYPE SUSPENSION INCLUDING A STABILIZER BAR

Takuya Murakami, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Dec. 15, 1987, Ser. No. 133,470

Claims priority, application Japan, Dec. 16, 1986, 61-193391[U]

Int. Cl.[4] B60G *3/06*

U.S. Cl. 280—665 **23 Claims**

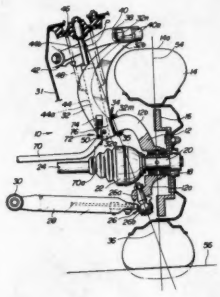
1. A double link type suspension system for the body of a vehicle comprising:

a knuckle for rotatably supporting a wheel of the vehicle;

a lower control arm having a first end section movably connected to a lower section of said knuckle by a first joint, and a second end section movably connected to a side of the vehicle body;

an extension member having a first end section relatively movably connected to an upper section of said knuckle, said extension member being relatively rotatable to said knuckle around a straight line passing through said first joint;

an upper control arm having a first end section movably connected to a second end section of said extension member, and a second end section connected to the side of the vehicle body;



a shock absorber disposed extending between the side of the vehicle body and the side of said wheel, a first end section of said shock absorber being connected to the side of the vehicle body and a second end section of said shock absorber being connected to said extension member; and

a stabilizer bar having an end section connected to said extension member.

4,875,704

FRONT WHEEL SUSPENSION STABILIZER MOUNTING STRUCTURE

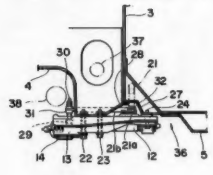
Kenji Tomosada, Higashihiroshima; Toshiro Kondo, Hatsukaichi; Tadanobu Yamamoto, Higashihiroshima, and Hiroshi Hashino, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 13, 1988, Ser. No. 181,614

Claims priority, application Japan, Apr. 13, 1987, 62-91499

Int. Cl.[4] G60G *11/50*; B62D *21/11*

U.S. Cl. 280—695 **17 Claims**



1. A front wheel suspension on a front car body comprising left and right suspension arms which are connected by a stabilizer bar so as to transmit twisting force caused by either one of said suspension arms to the other suspension arm, said front wheel suspension further comprising:

left and right supporting means connected to respective one ends of said left and right suspension arms for rotatably supporting left and right front wheels, respectively;

left and right coupling means fastened to an under surface of a frame member of the front car body for pivotally mounting said left and right suspension arms through pivot

means connected between the coupling means and the suspension arms; and

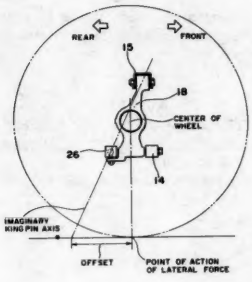
said stabilizer bar of which outer bar ends are bent forwardly and fastened to said left and right suspension arms, respectively, extending over an upper surface of each said coupling means and passing through spaces formed between said coupling means and an upwardly bent part of said frame member of front car body.

4,875,705

AUTOMOBILE REAR SUSPENSION STRUCTURE

Toshihide Koyama, Aki, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 14, 1988, Ser. No. 181,422
Claims priority, application Japan, Apr. 14, 1987, 62-92642
Int. Cl.[4] B60G *3/18*
U.S. Cl. 280—697 **21 Claims**



1. Rear suspension structure of an automotive vehicle having rear wheels and a vehicle body including a front end and a rear end, said structure comprising:

a rear wheel support supporting a said rear wheel of the vehicle,

said wheel support including an upper end portion, a front lower end portion disposed below said upper end portion, and a rear lower end portion disposed below said upper end portion and rearwardly of said front lower end portion, with respect to the vehicle body;

an H-shaped lower control arm having two outer end portions respectively connected to the lower end portions of said rear wheel support, and front and rear inner end portions disposed inwardly of said two outer end portions with respect to the width of the vehicle body and connected to the vehicle body in a manner which allows said lower control arm to pivot relative to the vehicle body,

a rubber bush pivotally connecting one of the outer end portions of said lower control arm and the front lower end portion of said rear wheel support,

a ball joint pivotally connecting the other of said outer end portions and the rear lower end portion of said rear wheel support;

an A-shaped upper control arm having an outer end portion pivotally connected to the upper end portion of said rear wheel support, and front and rear inner end portions disposed inwardly of the outer end portion of said upper control arm with respect to the width of the vehicle body and connected to the vehicle body in a manner which allows said upper control arm to pivot relative to the vehicle body; and

a damper unit disposed rearwardly of said upper control arm with respect to the vehicle body,

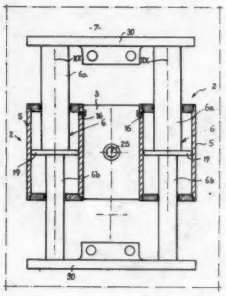
said unit including an upper end portion connected to the vehicle body, and a lower end portion connected to one of said lower control arm and said wheel support at a location disposed below the location at which the outer end portion of said upper control arm is connected to the upper end portion of said rear wheel support.

4,875,706

HYDROPNEUMATIC SUSPENSION UNIT FOR WHEELED VEHICLES, PARTICULARLY CROSS-COUNTRY VEHICLES

Philippe Joseph, Carpentras, and Jean Michel Perrochat, Montrouge, both of France, assignors to S.A.M.M. - Societe d'Applications des Machines Motrices, Bievres, France

Filed Sep. 6, 1988, Ser. No. 240,297
Claims priority, application France, Sep. 10, 1987, 87 12567
Int. Cl.[4] B60G *11/30*
U.S. Cl. 280—708 **5 Claims**



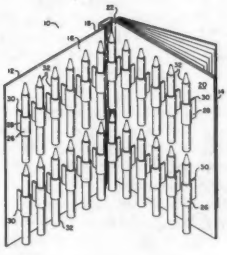
1. Hydropneumatic suspension unit for a wheeled vehicle, characterized in that: it comprises two hydropneumatic jacks (2) each being mounted on one side of an associated wheel (1) and forming a closed hydraulic circuit; each jack comprises a first member (6 or 5), adapted to be fixed to a chassis of the vehicle, and a second member (5 or 6) slidably mounted on the first member and having means at two opposite end portions thereof for guiding the sliding movement of said second member; and the two second sliding members (5 or 6) are rigidly connected together and mechanically fastened to the corresponding wheel (1).

4,875,707

COMBINED CRAYON AND COLORING BOOK HOLDER

Knute R. Krom, 1360 New Loudon Rd., Cohoes, N.Y. 12047

Filed May 27, 1988, Ser. No. 199,309
Int. Cl.[4] B42D *3/00, 3/12;* A45C *11/34;* B43K *25/00*
U.S. Cl. 281—30 **5 Claims**



1. A book-like receptacle for crayons comprising:

a front cover and back cover secured to each other, each cover having inner and outer surfaces;

a plurality of cylinders for holding crayons secured to the inner surfaces of the said front and back covers;

said front cover cylinders and back cover cylinders spaced apart from adjacent cylinders on the same cover, the distance between adjacent cylinders on the same cover being slightly less than the diameter of a cylinder such that when adjacent cylinders are full and the book is closed the cylinders will be in interdigital-type registry, adjacent front and back cylinders interlocking, and securing the book in the closed position.

4,875,708

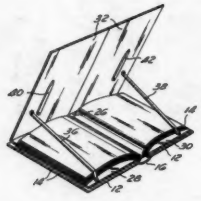
BOOK SHADE

Gerald F. Sremba; Patricia M. Sremba, both of 18281 Fernando Cir., Villa Park, Calif. 92667, and James P. Sullivan, Orange, Calif., assignors to Gerald F. Sremba and Patricia M. Sremba, both of Villa Park, Calif.

Filed Oct. 13, 1987, Ser. No. 107,984

Int. Cl.[4] B42D *3/00, 9/00*; A45C *9/00*

U.S. Cl. 281—45 **3 Claims**



1. A book shade for holding an open book having a plurality of pages, and shading the pages from incident light, comprising:

a top cover and bottom cover rotatably connected together adjacent a first edge of the covers, the covers being sized substantially the same as an open book of predetermined dimensions when the covers are substantially parallel to one another in a closed position; and

positioning means for holding the top cover in at least one selected position at an acute angle with respect to the bottom cover in order to block light incident on the pages of an open book placed between the covers; and

resilient retaining means connected to said bottom cover for retaining the pages of a book placed on said bottom cover open at selectable pages by resiliently urging a portion of the open book against the bottom cover when said top cover is at an acute angle with respect to the bottom cover.

4,875,709

CONTROLLED LEAK PATH

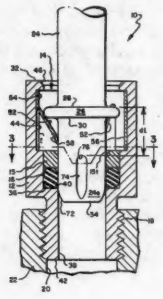
James E. Caroli, 8356 Main St., and Steven R. Zillig, Box 348, 8828 Main St., both of Williamsville, N.Y. 14221

Filed Feb. 26, 1988, Ser. No. 161,193

Int. Cl.[4] F16L *55/00*

U.S. Cl. 285—14 **4 Claims**

1. A fluid coupling assembly including a body provided with a first bore extending inwardly from one side of the body, an annular seal disposed within the bore, and a resilient retainer disposed between said one side of the body and the seal, the retainer including a plurality of prongs extending radially inwardly and towards the seal; the coupling further including a fluid line having a rigid tubular end portion with a radially outwardly extending flange disposed away from a terminal end of the end portion, characterized in that the coupling further comprises a controlled leak path disposed on the tubular end portion of the fluid line between the terminal end and the flange, the controlled leak path being so dimensioned that fluid may leak between the end portion and the seal when the end portion is not fully assembled within the body, but fluid will not leak between the end portion and the seal when the end



portion is fully assembled within the body with the prongs engaging the flange to prevent the withdrawal of the end portion.

4,875,710

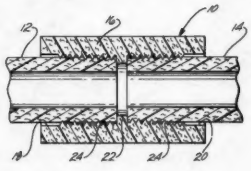
ABRASIVE THREADED FIBERGLASS PIPE JOINT

Hector P. Mercado, Wichita Falls, Tex., assignor to Ameron, Inc., Monterey Park, Calif.

Filed Jan. 25, 1988, Ser. No. 147,526

Int. Cl.[4] F16L *35/00*

U.S. Cl. 285—24 **13 Claims**



1. A fitting for attachment to a length of pipe having an internal and an external surface, comprising:

a sleeve member having an internal and an external surface and at least one end separating these surfaces; and

self tapping threads comprised of a grit and resin mixture and provided in at least a portion of one of the surfaces of the sleeve member for engaging at least a portion of one of the surfaces of the length of pipe when the fitting is attached to the length of pipe, said threads adapted to abrade material from and thereby form threads in the portion of the pipe surface engaged during attachment.

4,875,711

SLENDER TUBE CONNECTOR

Ikuo Watanabe, Susono, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Sunto, Japan

Filed Apr. 25, 1988, Ser. No. 185,447

Int. Cl.[4] F16L *55/00*

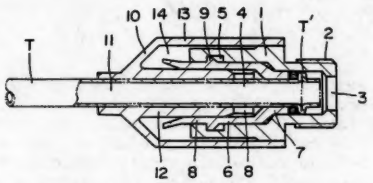
U.S. Cl. 285—45 **6 Claims**

1. A connector for connecting a slender tube having a forward connecting end and an outwardly bulging wall generally adjacent the forward connecting end, said connector comprising:

a socket member having opposed leading and trailing ends, the leading end of the socket member being engaged on the slender tube rearwardly of and generally adjacent to the outwardly bulging wall, said socket member further

comprising a plurality of free walls extending rearwardly and elastically outwardly from the cylindrical wall to define the trailing end of the socket member, the free walls being in spaced relationship to the slender tube, said free walls having at least one land on an outer circumferential portion thereof;

a connector body having opposed leading and trailing ends with a stepped connecting bore extending therebetween, a connecting portion being defined generally at the leading end of the connector body, the stepped connecting bore extending through the connector body and having an annular groove formed therein, the trailing end of the connector body being engaged over the forward connecting end of the tube and over the leading end of the socket member such that the annular groove of the connector body engages the land of the socket member, and such that the trailing end of the connector body is disposed forwardly of the trailing end of the socket member; and



an integrally formed elastic cap member having an inner cylindrical wall engaging the slender tube, the inner cylindrical wall having a leading portion disposed intermediate the tube and the free walls of said socket member, the inner cylindrical wall further having a trailing portion disposed rearwardly of the socket member, an outer cylindrical wall extending integrally from the trailing portion of the inner cylindrical wall, said outer cylindrical wall extending forwardly over the trailing ends of the socket member and the connector body, whereby the outer cylindrical wall of the elastic cap covers and protects the socket member and the connector body, and whereby the inner cylindrical wall of the cap member prevents the free walls of the socket member from deflecting inwardly and out of engagement with the annular groove of the connector body.

4,875,712

JOINT STRUCTURE FOR A TUBE SUPPORT PLATE AND A TUBE

Noriyuki Oda, Chiba; Tetsuo Takehara, Yokohama; Katsumi Higashi, Iruma, and Keiji Muramatsu, Ichikawa, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

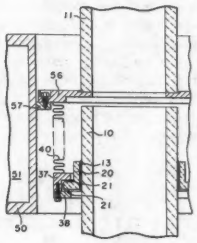
Division of Ser. No. 167,115, Mar. 11, 1988, Pat. No. 4,838,581, which is a division of Ser. No. 825,642, Feb. 3, 1986, Pat. No. 4,753,457. This application Mar. 14, 1989, Ser. No. 323,416

Claims priority, application Japan, Feb. 5, 1985, 60-19323; Feb. 25, 1985, 60-25903; May 28, 1985, 60-113123

Int. Cl.[4] F16L *59/16*

U.S. Cl. 285—47 **10 Claims**

1. A joint structure used for a hot gas system and having two ceramic tubes extending in the longitudinal direction, characterized in that said two ceramic tubes are vertically arranged with their axes aligned so that they pass through a retaining hole formed in a tube support plate made of metal which is cooled by cooling medium from the inside; an upper end portion of the first ceramic tube and a lower end portion of the second ceramic tube are respectively arranged in said retaining hole; a metallic flange which is attached to said tube support plate and is extended radially inside said retaining hole is attached to an end of a metallic bellows, and the other end of said



bellows is attached to a metallic ring which is attached to a circumferential part in an upper part of said first ceramic tube.

4,875,713

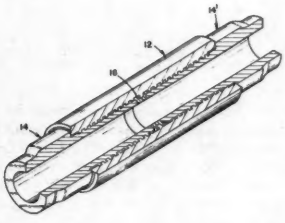
INTERNALLY COATED TUBULAR SYSTEM

Kenneth J. Carstensen, 4540 N. 44th St. No. 70, Phoenix, Ariz. 85018, assignor to Kenneth J. Carstensen, Phoenix, Ariz.

Continuation of Ser. No. 779,636, Sep. 24, 1985, abandoned. This application Mar. 17, 1988, Ser. No. 171,157

Int. Cl.[4] F16L *58/10*

U.S. Cl. 285—55 **6 Claims**



1. A coupling assembly for joining tubular goods, comprising:

a pair of tubular elements to be coupled together, each of said tubular elements terminating at nose ends, reference shoulders disposed on said elements and spaced from said nose ends, a plurality of male threads disposed on said elements between said nose ends and said reference shoulders;

a coupling collar for coupling said pair of tubular elements, said collar and said elements comprising a coupled assembly, said collar including female threads selected to threadedly receive said male threads and hold said tubular elements in coaxial alignment, said collar having an axial length selected for axial ends of said collar to abut said reference shoulders and maintain said nose ends in opposing spaced apart relation of predetermined distance;

opposing surfaces of said nose ends and said collar defining a circumferential groove;

a seal ring sized to be received within said groove, opposing surfaces of said ring and said coupled assembly defining an interface in which a gas may collect, said ring disposed between said interface and an interior of said coupled assembly;

normally closed apertures connecting said interface and said interior in normally closed gas flow communication, said apertures responsive to a pressure drop within said interior to open said gas flow communication to thereby relieve a pressure differential between said interface and

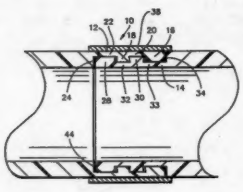
said interior, said apertures including at least one aperture extending through a radial dimension of said seal ring and connecting said interface and said interior in gas flow communication, said ring selected to have an axial dimension greater than said predetermined distance, said ring disposed within said circumferential groove with said nose ends urging against said ring, aperture defining surfaces of said ring resiliently deformed into face-to-face aperture closing contact in at least partial response to said urging, said ring further selected for pressure of a gas within said interface to act against said urging to open said aperture in response to a pressure drop within said interior.

4,875,714

PLASTIC PIPE WITH LOCKING INTEGRAL END CONNECTION

Leonard E. Lee, St. Louis, Mo., assignor to Mid-Continent Pipe & Supply Company, Inc., Fenton, Mo.

Continuation-in-part of Ser. No. 69,895, Jul. 6, 1987, Pat. No. 4,779,902. This application Sep. 28, 1988, Ser. No. 250,390
The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.
Int. Cl.[4] F16L *47/00*
U.S. Cl. 285—86 **24 Claims**



1. Plastic pipe having an integral end connection comprising a pair of female and male integral end connections for adjacent lengths of pipe adapted to be press-fitted together to form a locked end connection with said adjacent lengths of pipe, said female end connection comprising a plurality of discrete interior circumferentially extending radial, circular, uniform diameter ribs and plurality of discrete interior circumferentially extending radial, circular, uniform diameter grooves bordering said ribs, said male end connection comprising a plurality of corresponding discrete exterior circumferentially extending radial, circular, uniform diameter ribs and a plurality of discrete exterior circumferentially extending radial, circular uniform diameter grooves bordering said last named ribs, said male and female end connections being adapted to be axially press-fitted together to distend said female end connection and compress said male end connection until a mating relation of the ribs and grooves in said end connections is obtained, said ribs and said grooves having an axially extending wedge shape portion having a greater axial width than the remainder of the respective ribs and grooves from which they extend, said wedge shape portion extending exteriorly in an axial direction from a side of the ribs and interiorly in an axial direction from a side of the grooves to provide a locking fit to resist separation.

4,875,715

QUICK CONNECT CONNECTOR

Robert D. Dennany, Jr., Lapeer, and Duane J. Pontbriand, Rochester, both of Mich., assignors to ITT Corporation, New York, N.Y.

Filed Apr. 22, 1988, Ser. No. 185,012
Int. Cl.[4] F16L *55/00*
U.S. Cl. 285—87 **15 Claims**

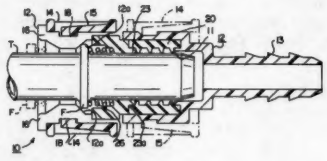
1. A quick connect connector comprising, in combination:

a connector housing having a first and second ends and a receiving portion fixedly provided therein, said housing having a fixedly mounted and radially deflectable retaining portion thereon;

a first chamber in said housing between said first and second ends and a sealing member therein;

a retaining collar slidably mounted on said housing between said first and second ends of said housing, said collar having at least one fixedly mounted and radially deflectable locking portion thereon;

said radially deflectable retaining portion being adapted to engagingly contact a flange portion on a connection member inserted in said housing when said retaining portion is deflected to retain said connection member in locked position relative to and in sealing engagement with said



sealing member between said retaining portion and said first end of said housing;

said radially deflectable locking portion being received within and adapted to engage said receiving portion fixedly provided in said housing to lock said collar relative to said housing when said collar is moved into a corresponding position wherein said collar maintains said retaining portion in engagement with the member to prevent removal of the member from said connector housing when said collar is locked at said corresponding position; and,

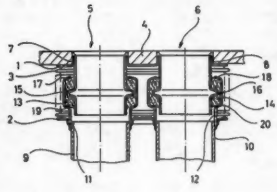
means for resiliently urging the member outwardly of said housing and the flange against said engaged retaining portion.

4,875,716

JOINTED PIPE CONNECTION, PARTICULARLY FOR AUTOMOTIVE EXHAUST PIPES

Wilfried Winzen, Pforzheim, and Manfred Wünschmann, Neuenburg, both of Fed. Rep. of Germany, assignors to Witzenmann GmbH Metallschlauch-Fabrik Pforzheim, Pforzheim, Fed. Rep. of Germany

Filed Feb. 10, 1987, Ser. No. 12,847
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610684
Int. Cl.[4] F16C *27/10*
U.S. Cl. 285—137.1 **25 Claims**



1. Jointed flexible connection for two approximately axially aligned, mutually axially movable pipes, particularly exhaust pipes (4,9,10,101,137,138; 102,139,140) of a motor vehicle, having

at least one flexible, generally cylindrical, gas-tight, and temperature-resistant metal bellows conduit element

(3,103) having a pair of ends, each of which is connected, at least indirectly, by welding to a respective one of said mutually movable pipes, thereby preventing gas leaks at said connection, and

means for connecting the pipes (9,10,101; 102) together in a load-bearing but angularly flexible and elastically damped manner, including

a support (11,12,105,145,146) secured to one of said pipes (9,10,102,139,140),

an inner protective tube (7,8,104,141,142) which defines a flow path for a flowing medium (5,6) passing from one of said pipes to another of said mutually axially movable pipes, the protective tube being disposed inside the bellows conduit element (3,103) and being connected to one of said pipes (9,10,101,138; 102,139), and

at least one resilient support pad (13,14,109,143,144) interposed radially between said inner protective tube and said support member (11,12,105,145,146),

wherein, in accordance with the invention,

said inner protective tube and said support member are respectively connected to different ones of said two mutually axially movable pipes;

the inner protective tube (7,8; 104; 114; 127,128; 141,142; 156) has a free portion of its length which engages with said at least one resilient support pad (13,14; 109; 121, 133, 143, 144, 160); and

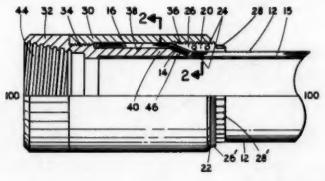
said resilient support pad is annular, is radially contained by said support member (11, 12; 105, 116, 130, 145, 146, 157), and axially engages against at least one of said inner protective tube (7,8 . . .) and said support member.

4,875,717

END CONNECTORS FOR FILAMENT WOUND TUBES

Frederick J. Policelli, Salt Lake City, Utah, assignor to Hercules Incorporated, Wilmington, Del.

Filed Feb. 17, 1987, Ser. No. 15,825
Int. Cl.[4] F16L *39/02*
U.S. Cl. 285—149 **6 Claims**



1. A hollow, connecting tube having a longitudinal axis that extends centrally within said tube along the length thereof, said tube comprising:

a filament wound tubular body having a longitudinal axis that is coincident with said tube axis, said tubular body having (a) an internally contoured end section for transmission of torque around said tube axis, a body section and a ramp section that is between said end section and said body section wherein filaments of said tubular body are of high strength and extend from said end section through said ramp section to a location within said body section remote from said ramp section, (b) inner dimensions that are larger in said end and ramp sections than in said body section, said ramp section having inner dimensions increasing along said longitudinal axis toward said end section and (c) outer dimensions that are larger in said end and ramp sections than in said body section, said ramp section having outer dimensions increasing along said longitudinal axis toward said end section;

a ring having (a) a outer surface with a threaded portion and a gripping portion and (b) an inner surface with a sliding portion and a ramp portion, said sliding portion being beneath that part of said threaded portion adjacent said gripping portion and said ramp portion being beneath that portion of said threaded portion remote from said gripping portion;

a cylindrical coupling having inner dimensions corresponding substantially to said inner dimensions of said filament wound tubular body and comprising an integral combination of (a) an externally contoured insertable portion adapted to fit within said tubular body beneath said end and ramp sections, wherein said externally contoured insertable portion is contoured to mate with said end and ramp sections within the contours thereof, (b) an end portion adapted for connection of said tube to another through coupling means carried integrally by said end portion and (c) a middle portion between said insertable and end portions along said tube axis, said middle portion having a threaded portion around an outer surface thereof, said threaded portion having an outer dimension that is greater than said inner dimensions of said end section;

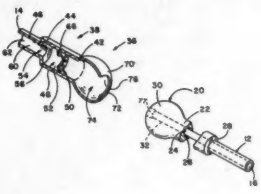
a sleeve having (a) a first integrally threaded end that is adapted to thread to said cylindrical coupling around said threads of said middle portion thereof, (b) a second integrally threaded end adapted to thread to said ring around said threaded portion thereof and (c) a smooth middle portion between said first and second threaded ends and adapted to slide over said end section of said tubular body.

4,875,718

SWIVEL CONNECTOR FOR PREVENTING KINKING OF FLEXIBLE MEDICAL HOSES

Robert E. Marken, 21495 Bear Creek Rd., Bend, Oreg. 97701

Filed Dec. 2, 1988, Ser. No. 279,048
Int. Cl.[4] A61M *15/00*; F16L *27/04, 31/00, 47/00*
U.S. Cl. 285—175 **5 Claims**



1. A swivel connector for preventing the kinking of a fluid hose, such as an oxygen hose, comprising:

(A) a ball member assembly which includes

(i) a first hose having an end, a sleeve having a bore defined therethrough for accommodating said first hose, said first hose end being located in said ball member assembly,

(ii) a hose retaining means in said sleeve securely holding said first hose in place in said sleeve,

(iii) a ball affixed to one end of said sleeve and spaced from said hose retaining means and having a bore defined diametrically therethrough to have ends defined in an outer surface of said ball, said ball bore being aligned with and fluidically joined to said sleeve bore and being sized to accommodate said first hose therethrough, said first hose being mounted in said sleeve by said hose retaining means to extend through one of said bore ends and to have said hose end spaced from another end of said bore and located inside said ball bore; and

(B) a socket member assembly which includes

(i) a second hose having an end, and a sleeve having

(a) a first portion with a bore defined therethrough, an annular hose supporting gland mounted in said sleeve first portion to accommodate and grasp said second hose, said second hose end being located in said first

portion, said annular gland having a cutout portion defined therein and having an annular opening that is sized so that said second hose is permitted to move therethrough in one direction while said gland prevents said second hose from backsliding therethrough in a second direction that is opposite to said one direction,

(b) a sleeve second portion with a bore defined therethrough, said sleeve second portion having an inner diameter that is approximately the same as the outer diameter of said second hose to snugly accommodate said second hose and being smaller in diameter than said first sleeve portion bore, and being joined to one end of said first sleeve portion to define a shoulder, with said annular gland being spaced from said shoulder,

(c) a second hose retaining means in said sleeve second portion holding said second hose in said sleeve second portion, and

(ii) a socket mounted on one end of said second sleeve first portion and having a hole defined therein which is sized to be larger than said ball member assembly sleeve and located to accommodate said ball member assembly sleeve when said ball is received in said socket, said socket being sized to essentially completely surround said ball;

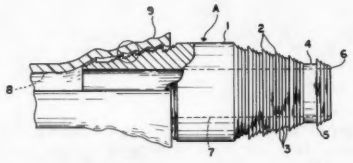
(C) said second hose retaining means holding said second hose in a position that has the end of said second hose spaced from said socket, with said sleeve second portion being larger than said second hose, said second sleeve, said gland and said ball forming a chamber in which said second hose end is located.

4,875,719

UNIVERSAL HOSE CONNECTOR

Christopher J. Mylett, 15502 Wandering Trail, Friendswood, Tex. 77546

Filed Jan. 26, 1989, Ser. No. 301,974
Int. Cl.[4] F16L *33/00*
U.S. Cl. 285—239 **2 Claims**



1. A coupling device for joining in a fluid-tight manner respective ends of two resilient tubing members, comprising:

an elongated cylindrical element having opposite end walls and provided with a central axially extending bore;

said element including a medial enlarged section defining the maximum diameter of said element;

a plurality of sets of outwardly directed major annular projections extending from said element intermediate said medial enlarged section and each said opposite end wall;

each major projection including an inclined outer face intersecting with a substantially radial inner face to provide an outermost circular edge;

said major projections progressively decreasing in diameter in a direction from said medial section toward said end wall, but not extending to said end wall;

each said major projection outer face having retaining means and sealing means;

a resilient tubing member force-fitted past each said end wall toward said medial section and stretched an increasing degree as said tubing member is forced toward said medial section, with said outer edges and said retaining means and sealing means providing a biting fluid-tight engagement with said tubing member;

a cylindrical planar extension adjacent each of said end walls; and

an outermost single major projection outer face disposed between said cylindrical planar extension and said end wall having retaining means;

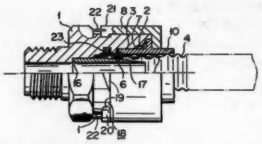
whereby force applied to said resilient tubing member increases biting engagement between said tubing member and said outermost major projection and reduces tensile force on remaining said projections.

4,875,720

FLUID COUPLING

Takeya Sasa; Yoshikazu Kobayashi, and Reichi Makishima, all of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,863
Claims priority, application Japan, Nov. 10, 1987, 62-171799[U]
Int. Cl.[4] F16L *33/26*
U.S. Cl. 285—249 **10 Claims**



1. A fitting for a metallic flexible, corrugated pipe, comprising:

a tubular main body having first and second ends;

a pipe insertion section formed in said tubular main body at said first end, said pipe insertion section including a large-diameter portion, and a small-diameter portion continuous with the large-diameter portion and located further inside the large-diameter portion;

a ring-shaped engaging member movably held by the large-diameter portion and movable toward the small-diameter portion, said engaging member being expansible or compressible and engaging with a root portion of a cylindrical, outer peripheral surface of the flexible pipe inserted in to said tubular main body when said engaging member is compressed;

a sleeve fitted around an outer peripheral surface of said tubular main body and movable in an axial direction;

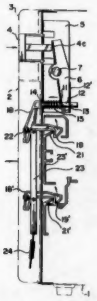
a tubular pressing member, provided in said sleeve, for enclosing the flexible pipe, said pressing member having an outer circumference engaged with said sleeve and being permitted to advance toward the small-diameter portion when said pressing member is located in said tubular main body; and

an annular metallic seal means which is tightly pressed against one of a distal end face, an outer surface and an inner surface of said pipe, to thereby seal said pipe, when said pipe is moved into said main body while being engaged with said engaging member.

4,875,721
LATCH ASSEMBLY FOR DOOR OR WINDOW OF MICROWAVE RANGE

Kenzo Okamoto, Osaka, and Fumihiko Kitada, Neyagawa, both of Japan, assignors to Imanishi Kinzoku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 10, 1988, Ser. No. 269,675
Int. Cl.[4] F05C 9/00
U.S. Cl. 292—29 **8 Claims**



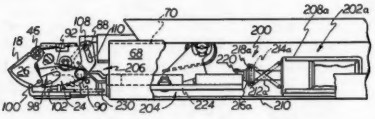
1. In a latch assembly for a cabinet door or window of an upright-type microwave range provided with an outer casing and a cavity or cooking cabinet contained in said outer casing, said cabinet door being pivotally mounted on a front portion or door-opening frame of said outer casing while provided with a pivotal hook member which is engaged with a dog projection of a hook housing mounted in said door-opening frame of said outer casing,

the improvement wherein: said door-opening frame is fixedly mounted on a peripheral portion of said cooking cabinet said door-opening frame is fixedly mounted and a hook-operating lever is pivotally mounted on said door-opening frame having a lower-end portion said rod is slidably mounted one end of a hook-operating rod the other end of which is brought into contact with said pivotal hook member of said cabinet door, said hook-operating rod being normally biased at its retracted position by a spring means; and an upper-end portion of said hook-operating lever is brought into contact with a push pin portion which is integrally formed with a push button in a projecting manner, said push button being mounted in a control panel of the microwave range in a retractable manner.

4,875,722
EXIT DEVICE ACTUATOR AND DOGGER

Theodore H. Miller, deceased, late of New Britain, Conn. (by Cecelia B. Miller, executrix), and Ronald S. Slusarski, Berlin, Conn., assignors to Emhart Industries, Inc., Farmington, Conn.

Division of Ser. No. 902,907, Sep. 2, 1986, Pat. No. 4,801,163.
This application Oct. 3, 1988, Ser. No. 252,837
Int. Cl.[4] E05B 65/10
U.S. Cl. 292—92 **6 Claims**



1. In an exit device comprising a latch bolt supported for pivotal movement about a first axis between projected and retracted positions, a deadlocking lever supported for pivotal movement about a second axis generally parallel to the first axis between a locking position and a non-locking position and having a blocker engagable with an associated portion of said latch bolt when said latch bolt is in its projected position and said deadlocking lever is in its locking position for deadlocking said latch bolt in its projected position, the improvement comprising:

a solenoid having a plunger movable along a third axis between first and second end positions, said third axis being substantially perpendicular to said first and second axes.

first linkage means coupled between said deadlocking lever and said solenoid for translating longitudinal motion of said plunger of said solenoid to pivotal motion of said deadlocking lever,

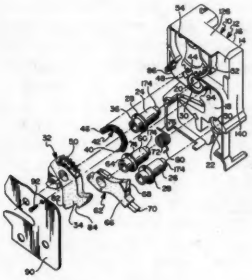
second linkage means coupled between said solenoid plunger and said latch bolt for translating longitudinal motion of said solenoid plunger to pivotal motion of said latch bolt so that when said solenoid plunger is moved to said first end position, said deadlocking lever is pivoted to its non-locking position and said latch bolt is pivoted to its retracted position, the movement of said deadlocking lever from its locking position to its non-locking position causes the first linkage means to move a first distance, and the movement of said latch bolt from its extended position to its retracted position causes the second linkage means to move a second distance, with said second distance being greater than the first distance, and

said first linkage means comprises means for slipping itself relative to said second linkage means during movement of said plunger to said first end position to accommodate for the movement differential between the first and second linkage means.

4,875,723
CLOSURE LATCH

David E. Compeau, Mt. Clemens; Mark Manuel, Sterling Heights, and Lloyd W. Rogers, Jr., Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 3, 1988, Ser. No. 163,503
Int. Cl.[4] E05C 3/26
U.S. Cl. 292—201 **11 Claims**



1. A closure latch comprising, in combination, a latch frame, a latch bolt mounted on one side of the latch frame for movement between latched and unlatched positions, a latch operator mounted on the one side of the latch frame and movable to a latch bolt release position to control movement of the latch bolt to unlatched position, an actuating means controlling the latch operator and including, an actuator mounted on the other side of the latch frame for movement between neutral and operating positions, means on the actuator extending to the one side of the latch frame for engagement with the latch operator to move the latch operator to release position concurrently with movement of the actuator to operating position, driven

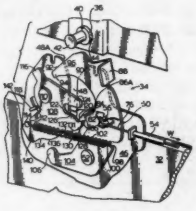
means, means mounting the driven means on the other side of the latch frame for movement between neutral and driving positions, resilient means locating and driven means in the neutral position and resisting movement thereof to the driving position, power operated driving means for moving the driven means from the neutral position to the driving position, and means on the driven means engageable with the actuator for moving the actuator to the operating position upon movement of the driven means to the driving position, the resilient means returning the driven means to the neutral position upon cessation of operation of the power operated driving means.

4,875,724

HOOD LATCH MECHANISM

Herbert Gruber, Markham, Canada, assignor to Magna International Inc., Markham, Canada

Filed Oct. 26, 1987, Ser. No. 112,478
Claims priority, application Canada, Oct. 29, 1986, 521738
Int. Cl.[4] E05C *3/26*
U.S. Cl. 292—216 **52 Claims**



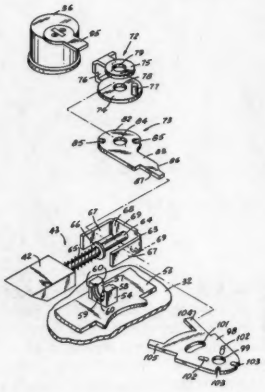
1. A latch mechanism comprising a mounting plate carrying a slot having a mouth, a pivotably-biased pawl mechanism comprising a top arm and bottom arm and centrally disposed detent, a ratchet mechanism biased for rotation carrying a notch having a mouth, a detent on one side of the notch for engaging the detent of the pawl mechanism for precluding the rotation of the ratchet mechanism, the mouth of the notch of the ratchet mechanism for aligning with the mouth of the slot for both receiving a striker, and stop means to stop the rotation of the ratchet mechanism when the mouth of the notch is aligned with the mouth of the slot to prevent over-rotation of the ratchet mechanism, the ratchet mechanism arranged for guiding the striker to proximate the bottom of the slot so that the detent of the pawl engages the detent of the ratchet mechanism precluding the ratchet mechanism from rotating to release the striker, the arm on the top of the pawl mechanism normally positioned over the slot and being precluded from movement away from the slot unless the mouth of the notch and mouth of the slot are both directed towards the top arm and whereby if the mouths of the notch and slot are not aligned but the striker is proximate the mouths of the notch and slot and the ratchet mechanism has not engaged the stop means but is proximate thereto, movement of the pawl mechanism away from the ratchet mechanism causes the portion of the ratchet mechanism remote the notch to be engaged by the bottom arm of the pawl mechanism and align the mouth of the notch with the mouth of the slot, and when aligned, a clearance is provided between the bottom arm and portion of the ratchet mechanism remote the notch to permit the top arm to be pivoted away from over the slot, and whereby when the arm on the top of the pawl mechanism is pivoted from over the slot and rotation is attempted of the ratchet mechanism, the ratchet mechanism attempts to cause the arm on top of the pawl mechanism to be pivoted to a position over the slot thereby preventing accidental release of the striker.

4,875,725

WOVEN-WIRE GATE LOCK

George R. Marks, 19, The Hemlocks, Roslyn Estates, N.Y. 11576

Filed Dec. 28, 1987, Ser. No. 138,133
Int. Cl.[4] E05B *15/04*
U.S. Cl. 292—244 **13 Claims**



1. A woven-wire gate lock comprising:

a housing having a faceplate, a wall projecting from the faceplate and substantially surrounding the interior of the housing, and a removable cover for closing the housing,

a stationary bracket within the housing projecting from the faceplate, the bracket presenting two opposite surfaces each having a ledge spaced from and facing the faceplate, and the bracket having an endface remote from the faceplate,

a cutout in the bracket terminating at the endface so that the cutout is open at the endface,

a latch projecting from the housing and movable with respect to the housing between latched and unlatched positions, the latch being reversible so that it can project from the housing in either of two opposite directions,

a rod carried by the latch, the rod being accommodated within the cutout in the bracket, the rod being insertable into and removable from the cutout through the opening of the cutout at the bracket endface,

manually-manipulable means carried by the housing for initiating movement of the latch from its latched position to this unlatched position,

a spring constantly urging the latch toward its latched position, and

a member engageable with the bracket in a location between the faceplate and either of the two ledges, the ledge with which the member cooperates preventing movement of the latch in a direction away from the faceplate, and the spring maintaining the engagement between the member and the bracket,

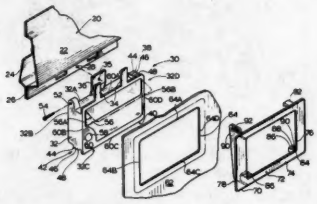
whereby the latch is prevented from accidentally falling out of the housing when the housing cover is is removed and the housing is open.

4,875,726

COMPENSATING ESCUTCHEON PLATE FOR CAR DOOR

Wolfgang Thau, Concord, Canada, assignor to Magna International Inc., Markham, Canada

Filed Nov. 17, 1987, Ser. No. 122,133
Claims priority, application Canada, Dec. 3, 1986, 524487
Int. Cl.[4] E05C *21/00*
U.S. Cl. 292—337 **12 Claims**



1. A compensating escutcheon plate assembly having length, height and depth, the compensating escutcheon plate assembly comprising a continuous peripheral annular flange presenting an outer annular surface on one side and a back surface on the other side, the peripheral annular flange surrounding a central opening through the escutcheon plate, the flange having a continuous outer peripheral edge and a continuous inner peripheral edge surrounding the central opening, the back of the flange for engaging exterior door panel material of a vehicle door surrounding an opening in the panel provided through the exterior door panel for mounting a handle carrying assembly carrying a handle for opening and closing the door, formations carried on the compensating escutcheon plate assembly for positioning and fastening the compensating escutcheon plate assembly to complementary formations carried on a handle carrying assembly for causing the back surface of the peripheral flange to abut an exterior door panel material surrounding the opening through which the handle carrying assembly is mounted, the formations carried on the escutcheon plate assembly carrying means for engaging and being secured to complementary means carried on the complementary formations, both said last aforementioned means being secureable together to permit the positioning of the length of the peripheral flange at different positions relative to the door handle assembly when the two are mounted together for use and to permit the escutcheon plate to be mounted at various depths relative to the handle assembly when the back surface of the peripheral flange engages the exterior door panel material thereby providing a compensating escutcheon plate to close any openings between the material surrounding the aperture provided in the exterior door panel through which access is provided to the handle and the assembly carrying the handle to compensate for the irregularities in the manufacture of the assembly and exterior door panel and changes caused by the environment in which the exterior door panel of the vehicle door is located (for example, contraction and expansion due to temperature changes).

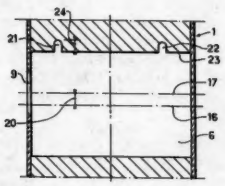
4,875,727

COVERING ELEMENT FOR MULTILOCK FITTING FASTENED TO A DOOR, WINDOW OR THE LIKE

Jean-Jacques Kautt, Strasbourg, France, assignor to Ferco International, Surrebourg, France

Filed Dec. 14, 1987, Ser. No. 132,363
Claims priority, application France, Dec. 24, 1986, 86 18472
Int. Cl.[4] E05C *21/00*
U.S. Cl. 292—337 **11 Claims**

1. A cover member for a multilock fitting adapted to be used with a structure including a fixed frame, a movable frame and a jamb with an edge, said multilock fitting comprising a plurality of blocks and a plurality of locking bolts, said cover member comprising a tubular member of rectangular section having a relatively short side and a relatively long side, said relatively short side including a plurality of first apertures permitting passage of said plurality of locking bolts through said relatively short side and positionable so as to be coplanar with said edge of said jamb and said relatively long side covering said plurality of blocks and wherein said relatively long side comprises a plurality of second apertures having median planes, which



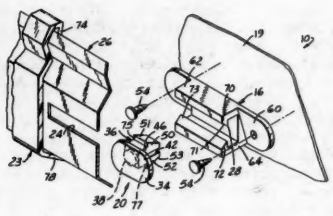
plurality of second apertures permit passage of said plurality of blocks through said relatively long side, wherein said tubular member is vertically movable relative to said blocks and wherein said plurality of first apertures have axes spaced a predetermined distance from said median planes of said plurality of second apertures, said predetermined distance being equal to the extent of vertical movablility of said tubular member relative to said plurality of blocks.

4,875,728

BUMPER FACIA ATTACHMENT STRUCTURE

David F. Copp, Dryden, and Stephen J. Wojciehowski, Sterling Heights, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Sep. 16, 1988, Ser. No. 245,232
Int. Cl.[4] B60R *19/02, 19/24*
U.S. Cl. 293—126 **3 Claims**



1. Attachment structure for securing the end pieces of a vehicle bumper facia to a vehicle body, the vehicle bumper facia being of the type fabricated of a flexible plastic material and including an elongated central portion, the vehicle body including a structural bumper member, said central portion being attached to the structural bumper member, a facia end piece extending from each end of the central portion longitudinally of the vehicle body, a fastener fabricated of a flexible material secured to the inner face of each end piece, each fastener including a stem which extends toward the vehicle body, the stems being bifurcated and each stem defining a pair of spaced apart flexible tangs, each tang terminating in an enlarged portion, an elongated retainer clip fabricated of flexible material mounted on each side of the vehicle body in a position oppositely disposed from one of the stems, each retainer clip being generally C-shaped in cross-section and including a back wall, upper and lower side walls extending outwardly therefrom and downwardly and upwardly extending lips on the outer edges of the respective upper and lower side walls, the lower and upper edges of, respectively, the

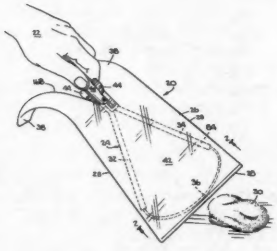
upper and lower lips being spaced apart to define an elongated open ended slot, the fasteners being engaged with the retainer clips by forcing the stems into the slots with initial flexing of the tangs together and flexing of the upper and lower side walls of the retainer clip apart to permit passage of the enlarged portions through the slots with subsequent springing of the tangs apart and the side walls together, the enlarge portions thereafter engaging the inner surfaces of the lips to prevent withdrawl thereof through the slots, the retainer clips being positioned with respect to the end pieces and fasteners when the end pieces are secured in place by the fasteners to permit disengagement of the fasteners from the retainer clips by flexing the end pieces and sliding the fasteners past the open ends of the slots of the retainers clips which are closest to the central portion of the vehicle bumper facia.

4,875,729

APPARATUS FOR PACKAGING WASTE MATERIAL

Joel S. Peck, 434 E. 70th St., #3A, New York, N.Y. 10021

Filed Feb. 5, 1988, Ser. No. 152,911
Int. Cl.[4] A01K *29/00*; E01H *1/12*
U.S. Cl. 294—1.3 **14 Claims**



9. A device for packaging waste material in a bag in a rapid and reliable manner, with a minimum of handling, and without the need to contaminate the open end of the bag with waste material during the packaging procedure, said device comprising:

(a) a bag having an open end, a closed end, a first surface, a second surface, a central portion spaced from the open end of the bag, and a periphery;

(b) a frame defining an open area and located at least partially within the bag with the first surface of the bag directed inwardly towards the frame, the second surface of the bag directed outwardly away from the frame, and the central portion of the bag in registration with the open area of the frame; and

(c) means to invert the bag as the bag is removed from the frame after waste material has been positioned on the central portion of the second surface of the bag so that when the bag is free of the frame the first surface is directed outwardly, the second surface is directed inwardly, and the waste material is inside the bag adjacent the second surface of the bag.

4,875,730

TRUCK BED LOAD ORGANIZER AND STABILIZER APPARATUS

Kendall W. Justice, 7727 W. Mulbery, Phoenix, Ariz. 85033

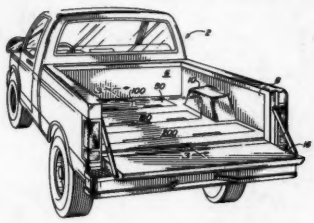
Filed Oct. 11, 1988, Ser. No. 255,999
Int. Cl.[4] B60P *3/34*
U.S. Cl. 296—37.5 **6 Claims**

1. Apparatus for organizing and stabilizing a load on a truck bed, comprising, in combination:

base means disposed on the truck bed for supporting a plurality of panels;

a plurality of cutout portions in the base means;

panel means disposed in the plurality of cutout portions, including a plurality of panels disposed in the plurality of cutout portions and pivotable from a down position aligned with the base means to an up position generally



perpendicular to the base means for organizing and stabilizing the load; and

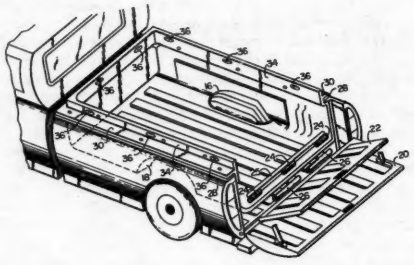
first hinge means at the cutout portions, and each panel of the plurality of panels is secured to the first hinge means.

4,875,731

COMBINATION PICK-UP TRUCK BED LINER AND CAMPER TOP

Samantha L. Ruiz, 684 Robinson Dr., Prescott, Ariz. 86301

Filed Jun. 27, 1988, Ser. No. 211,855
Int. Cl.[4] B62D *33/02*
U.S. Cl. 296—37.2 **7 Claims**



1. An article of manufacture, comprising:

a truck bed lining means that protectively overlies a truck bed and that conforms to the configuration and dimension of said truck bed;

said truck bed lining means being releasably secured in overlying relation to said truck bed;

said truck bed lining means forming a camper top means when released from its overlying relation to said truck bed, inverted and secured in enclosing relation to said truck bed; and

a closure member hingedly connected to said truck bed lining means, said closure member cooperating with a tailgate means of a truck to enclosed a bed area of said truck when said truck bed lining means is in its inverted, camper top means-providing position.

4,875,732

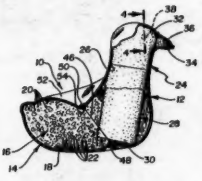
CHAIR CONSTRUCTION

Anthony D. Miller, 2103 Emerson Ave. South, Minneapolis, Minn. 55405

Continuation of Ser. No. 46,658, May 4, 1987, abandoned. This application Jul. 20, 1988, Ser. No. 221,899

Int. Cl.[4] A63G 9/10

U.S. Cl. 297—181 12 Claims



1. A chair, comprising:

(a) a flexible envelope having a first portion defining a reservoir therewithin, and a second portion disposed proximate a periphery of said first portion wherein said second portion can be extended upward from said first portion, an interior of said second portion communicating with said reservoir;

(b) a generally elongated member received in said second portion of said envelope and having a base extending downwardly into said reservoir; and

(c) a quantity of fill occupying said reservoir and having said base of said elongated member immersed therein, said fill surrounding at least a lower portion of said base and having a consistency and a density such that it will tend to maintain said pillar-like member at a constant angle relative to a surface on which the chair is positioned when torqueing force, less than of a threshhold amount, is applied thereto, yet will permit angular adjustment of said pillar-like member relative to the surface on which the chair is positioned when torqueing force applied to said pillar-like member exceeds the threshold amount.

4,875,733

VEHICLE REAR BODY STRUCTURE

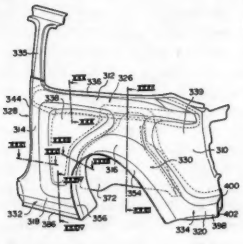
Hiroyuki Chado; Tatsuo Maeda, both of Hiroshima, and Mitsusou Nakano, Kure, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 9, 1988, Ser. No. 166,099

Claims priority, application Japan, Mar. 10, 1987, 62-54417; Mar. 12, 1987, 62-57607

Int. Cl.[4] B62D 25/02, 25/08

U.S. Cl. 296—195 1 Claim



1. A vehicle rear body structure including a rear inner panel having a bulged portion extending longitudinally, a first reinforcement panel extending longitudinally along the bulged portion and joined with an inner side surface of the rear inner panel to form a belt line reinforcement structure of a closed cross-section, a second reinforcement panel having an arcuate configuration and joined with the inner side surface of the rear inner panel at a lower end portion and joined with the first reinforcement panel at an upper end portion so that a space is formed under a tire housing flange formed at a lower end portion of the second reinforcement for receiving a rear wheel, and the rear inner panel, the first and second reinforcement panels being joined to form a tire housing reinforcement structure of a closed cross-section which extends forwardly to a side sill structure which forms a lower side frame structure of the body structure and extends rearwardly to a lower flange portion of the rear inner panel formed at a rear end portion thereof.

4,875,734

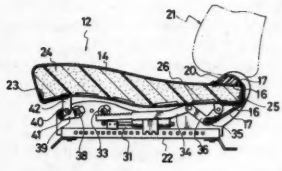
AUTOMOTIVE SEAT

Sho Yokoyama, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1987, Ser. No. 139,784

Int. Cl.[4] A47C 3/00

U.S. Cl. 297—284 6 Claims



1. An automotive seat comprising a seat cushion raisable and lowerable vertically by a lifter with respect to brackets integrally mounted to slide rails and a seat back fixed at a constant height, wherein an expandable and contractible resilient member is disposed at a position on the upper surface of said seat cushion to which the lower end portion of said seat back faces, and said resilient member is covered by a cover so as to close a spacing between said seat cushion and said seat back.

4,875,735

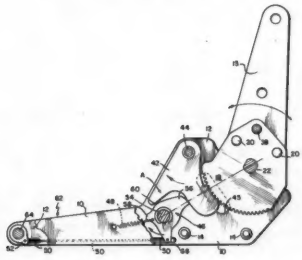
SEATBACK RECLINER MECHANISM

George A. Moyer, 70355 Hilltop La., Union, Mich. 49130, and Chung L. Chang, 15737 Garfield Ave., No. 17, Paramount, Calif. 90723

Filed Mar. 30, 1984, Ser. No. 595,473

Int. Cl.[4] B60N 1/06

U.S. Cl. 297—367 16 Claims



1. A hinge fitting for a reclining vehicle seat structure comprising:

fixed support means;

a seatback support member pivotally connected to said fixed support means by a first pivot means for movement from an upright position rearwardly through a range of rearwardly inclined positions;

a locking member pivotally connected to said fixed support means by a second pivot means for fixing said seat back support member in adjusted position throughout the range of rearwardly inclined positions;

lock actuating mean for moving said locking member to a locking and to an unlocking position, said locking means including a cam pivotally connected to said fixed support means by a third pivot means, said cam having a first cam arm engageable with said locking member to cam said locking member into said locking position, said cam having a second cam arm engageable with said locking member to cam said locking member into said unlocking position;

said lock actuating means including anti-unlocking means for preventing movement of said locking member out of said locking position in response to forces applied to said seatback support member; and

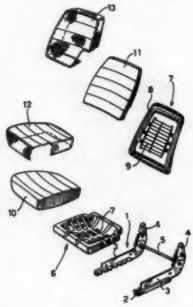
said anti-unlocking means including a camming surface on said first said cam arm which engages said locking member at an engagement point when said locking member is in said locking position such that a force acting perpendicularly at said engagement point tends to pivot said cam such that said first cam arm urges said locking member towards said locking position.

4,875,736

METHOD FOR THE PRODUCTION OF MOTOR VEHICLE SEATS AND SEATS OBTAINED BY THIS METHOD

Silvio Brambilla, Grugliasco, Italy, assignor to SICAM S.p.A., Turin, Italy

Filed Sep. 14, 1988, Ser. No. 244,235
Claims priority, application Italy, Sep. 14, 1987, 67780
Int. Cl.[4] A47C 7/00
U.S. Cl. 297—440 **5 Claims**



1. A method for the production of motor vehicle seats comprising:

providing a plurality of different first seat sub-units having a main frame provided with a plurality of different seat adjustment mechanisms, each including at least a longitudinal guide device and a backrest adjustment device;

providing a plurality of different second sub-units each including a squab frame and different adjustment mechanisms;

providing a plurality of different third sub-units each including a backrest frame and different adjustment mechanisms;

providing a plurality of different fourth and fifth sub-units constituted respectively by the padding adapted to be secured to said squab frame and said backrest frame and respective outer coverings for the padding;

selecting a specific sub-unit from each of said first through fifth sub-units; and

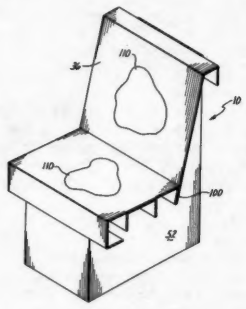
assembling the selected sub-units into a motor vehicle seat.

4,875,737

DISASSEMBLABLE CORRUGATED BOARD BACKED CHAIR

Alfonso Cardenas, Pico Rivera, Calif., assignor to Sunclipse, Inc., Montebello, Calif.

Filed Oct. 5, 1988, Ser. No. 253,494
Int. Cl.[4] A47C 7/00
U.S. Cl. 297—442 **13 Claims**



9. A corrugated board chair comprising:

A. A corrugated board sheet formed into a box-like configuration with a front panel, said front panel having an upper edge and being transversely slotted below said edge two side panels and a rear panel, each panel having upper and lower edges and opened at its top and bottom to define a cavity rectangular in horizontal cross-section, the rear panel and edge portions or each side panel connected to the rear panel being higher than the upper edges of the remainder of the portions of the side panels, said higher side panel edges being joined to said lower upper side edge panel portions by angular intermediate edge portions, each of said lower side edges being slotted transversely at two locations spaced from each other and from the front panel, and further being transversely slotted at the point where said lower edge meets the said angular intermediate edge;

said front panel being transversely slotted below its upper edge, and slotting being extended into the side panels;

B. A corrugated board channel member, said channel member being inverted to present downwardly extending edges and disposed transversely to, and seated on, said side panels with the edges of said channel member extending into the spaced apart slots in the upper edges of said side panels; and

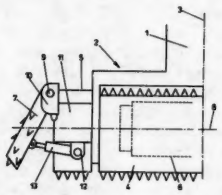
C. A corrugated board seat and back panel, said panel being of a width greater than the distance between said two side panel edges when the corrugated board sheet is in its box-like configuration and having one end inserted into said front panel slotting and its extensions into the side panels, being bent 90 degrees to extend up over the upper edge of the front panel and further simularly bent to lay on the upper edges of the lower side panels edge portions, and on said channel member; being further bent back upon itself for insertion into the slotting where the angular intermediate edges join the said lower side panel edge portions, and further laid over the angular intermediate edges to extend up over the higher side panel edges for securing thereon.

4,875,738

ARM-SUPPORTED CUTTING ROLL WITH EFFECTIVE LENGTH PIVOTALLY ADJUSTABLE ALONG MINING FACE

Alfred Zitz, Zeltweg, and Erich Brandl, Grosslobming, both of Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria

Filed Oct. 25, 1988, Ser. No. 261,893
Claims priority, application Austria, Oct. 29, 1987, 2856/87
Int. Cl.[4] F21C *27/24*
U.S. Cl. 299—80 5 Claims



1. An arm-supported cutting roll having an effective length which is adjustable along a mining face, comprising:

an axially elongated cutting roll having two opposite ends;

an arm mounting said cutting roll for rotation about a longitudinal axis of said cutting roll;

said cutting roll having a plurality of cutting tools provided on a radially outer peripheral surface thereof having tips disposed for engagement, in use, with a mining face for cutting material from the mining face as the cutting roll is rotated about said axis;

means providing a swivel joint on said cutting roll, near one end thereof, said swivel joint being located closer to said longitudinal axis than are said tips of said cutting tools, said swivel joint providing a pivot axis which extends crosswise of an imaginary plane containing said longitudinal axisl;

a tool carrier mounted to said swivel joint for pivotal movement about said pivot axis between a retracted position in which said tool carrier effectively extends said cutting roll axially by a first, lesser amount, and an extended position in which said tool carrier effectively extends said cutting roll axially by a second, greater amount;

means for operating said swivel joint for pivoting said tool carrier about said pivot axis to a desired position delimited by said retracted position and said extended position;

at least one cutting rool provided externally on said tool carrier, having a tip disposed for engagement, in use, with the mining face for cutting material from the mining face as the cutting roll, and thereby the tool carrier is rotated about said axis.

4,875,739

INDEPENDENT CONTINUAL QUICK SERVICE VALVE DEVICE

James E. Hart, Trafford, and Edward W. Gaughan, Irwin, both of Pa., assignors to American Standard Inc., Wilmerding, Pa.

Filed Jan. 17, 1989, Ser. No. 297,721
Int. Cl.[4] B60T *15/42*
U.S. Cl. 303—33 13 Claims

1. For use in an automatic fluid pressure brake system for a railway vehicle, a continual quick service valve device for providing a local venting of fluid pressure carried in a trainline brake pipe comprising:

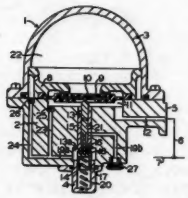
(a) a control piston delineating a control chamber on one side thereof connected to said brake pipe and a quick service reference chamber on the opposite side thereof;

(b) a first passage between said control chamber and said reference chamber via which said reference chamber is charged with fluid pressure from said brake pipe;

(c) an exhaust passage having a connection with said first passage at a location intermediate said control chamber and said reference chamber;

(d) valve means in said exhaust passage for normally interrupting venting of said first passage in a deactuated condition of said control piston and for establishing venting of said first passage in an actuated condition of said control piston;

(e) first choke means in said first passage between said reference chamber and said connection of said exhaust passage with said first passage for restricting the backflow of fluid



pressure from said reference chamber in response to an external reduction of said brake pipe fluid pressure to thereby establish an actuating pressure differential across said control piston and, accordingly effect said actuated condition thereof, whereby the fluid under pressure in said control chamber and the fluid under pressure in said reference chamber are concurrently vented locally via said exhaust passage; and

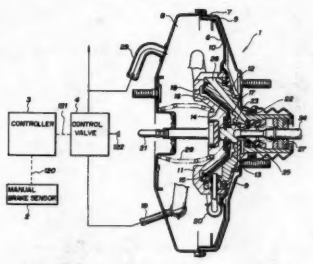
(f) second choke means in said first passage between said control chamber and said connection of said exhaust passage with said first passage for controlling the rate at which said brake pipe pressure is vented locally from said control chamber.

4,875,740

BRAKING DEVICE FOR USE IN A MOTOR VEHICLE

Toshio Takayama, Kanagawa, Japan, assignor to Tokico, Ltd., Japan

Continuation of Ser. No. 13,420, Feb. 11, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,314
Claims priority, application Japan, Feb. 20, 1986, 61-33531; Feb. 20, 1986, 61-23307[U]; Apr. 18, 1986, 61-58307
Int. Cl.[4] B60T *15/04, 8/86;* F15B *13/10*
U.S. Cl. 303—50 4 Claims



1. A braking device for use in a motor vehicle comprising:

a vacuum motor having a casing;

a power piston displaceably mounted in the casing through a diaphragm to partition the interior of the casing into a

constant pressure chamber and a variable pressure chamber and displaceable by the pressure difference between the two chambers;

an input rod adapted to be connected to a brake pedal;

a valve mechanism disposed in the power piston for controlling the pressure in the variable pressure chamber in response to force applied to the input rod;

a control valve connected to the vacuum motor for controlling the pressure in the variable pressure chamber independently from said valve mechanism, said control valve being electrically controllable for generating an output for controlling the pressure in the variable pressure chamber which is proportional to the current applied to the control valve;

a controller for controlling the current applied to said control valve;

a manual actuator for controlling said controller in response to an input applied to said manual actuator; and

a sensor for detecting the amount of the input applied to said actuator and for sending an output corresponding to the amount of the input detected by said sensor to said controller;

said controller including determining means for determining whether the amount detected by the sensor is on an increasing gradient or on a decreasing gradient and for generating signals corresponding to said determination, and control means for controlling the current to be applied to said control valve in response to the signals from said determining means for causing the current corresponding to the amount of input detected by the sensor as being on an increasing gradient and the current corresponding to the amount of input detected by the sensor as being on a decreasing gradient to be proportional respectively to the amount of the input applied to the manual actuator, and also for causing said current corresponding to an increasing gradient input and said current corresponding to a decreasing gradient input to be different from each other by a predetermined value with respect to the amount of the input applied to the actuator.

4,875,741

ANTI-SKID BRAKING CONTROL SYSTEM FOR USE ON MOTOR VEHICLE

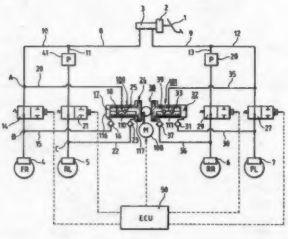
Takashi Ozawa, Gifu; Hitoshi Tanaka, Oobu; Takahiro Goshima, Gifu, and Kozi Takagi, Takahama, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 1, 1989, Ser. No. 304,595

Claims priority, application Japan, Feb. 2, 1988, 63-23304

Int. Cl.[4] B60T *8/40*

U.S. Cl. 303—116 **12 Claims**



1. An anti-skid braking control system for use on a motor vehicle having first and second wheels, comprising:

a master cylinder;

first and second wheel cylinders for braking the first and second wheels, respectively, with a braking medium pressure transmitted from said master cylinder;

first and second solenoid-operated valves disposed in pipes interconnecting said master cylinder and said first and second wheel cylinders, respectively, for selectively providing communication between said master cylinder and said first and second wheel cylinders through said pipes;

first and second pumps connected to said pipes, respectively, for delivering a braking medium from downstream portions of said pipes which are disposed downstream of said first and second solenoid-operated valves with respect to the direction in which the braking medium pressure is transmitted from said master cylinder to said first and second wheel cylinders, to upstream portions of said pipes which are disposed upstream of said first and second solenoid-operated valves with respect to said direction; and

said first and second pumps comprising a common housing, a common plunger slidably disposed in said common housing and reciprocally movable therein, and first and second pressure varying chambers defined by said plunger independently of each other and having respective volumes variable in response to reciprocating movement of said common plunger, said first and second pressure varying chambers having inlet ports, respectively, connected directly to said downstream portions of said pipes.

4,875,742

SOLENOID OPERATED HYDRAULIC CONTROL VALVE

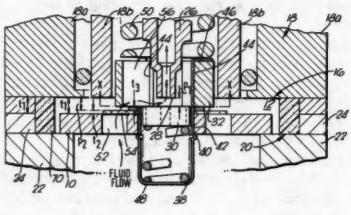
Michael J. Hawker, Lincoln, England, assignor to Clayton Dewandre Co. Ltd., Lincoln, England

Filed Apr. 22, 1988, Ser. No. 184,738

Claims priority, application United Kingdom, Apr. 23, 1987, 8709615

Int. Cl.[4] B60T *15/02*; F16K *31/02*

U.S. Cl. 303—119 **14 Claims**



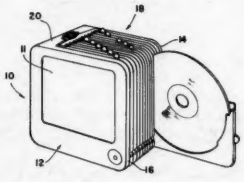
1. A solenoid-operated control valve, said control valve comprising a valve element and a valve seat, each having a flat surface, each said flat surface being co-operable to control a flow of fluid through said valve, wherein at least a portion of a solenoid armature has opposed parallel surfaces and is disposed within a gap defined between parallel faces for movement axially within said gap to operate said valve, wherein said flat surface of said valve seat is disposed in a plane of one of said parallel faces, and wherein one of said parallel faces is a face of a solenoid stator, a first spacing means whose thickness determines a magnetic reach of said armature, a second spacing means disposed in said gap to intervene between said armature and said face of said solenoid stator and whose thickness determines an energized gap between said armature and said stator when said solenoid is energized, and a third spacing means whose thickness defines a distance between said valve element face and one of said armature surfaces to produce excess travel of said valve element relative to said armature travel, whereby wear or erosion of one of said valve element and said valve seat is compensated.

4,875,743

RECORDING MEDIA STORAGE APPARATUS

Anthony Gelardi, Cape Porpoise, Me.; Alan Lowry, Canton, Mass., and Craig Lovecky, Old Orchard Beach, Me., assignors to Shape Inc., Biddeford, Me.

Filed Jul. 5, 1988, Ser. No. 215,357
Int. Cl.[4] A47B 81/06
U.S. Cl. 312—13 36 Claims



1. An apparatus for storing a plurality of disc-shaped recording media, each having an outer circumferential edge, comprising;

portable housing means for securely housing and portably transporting the plurality of disc-shaped recording media;

holder means, pivotally connected to the housing, for holding the plurality of disc-shaped recording media by the outer circumferential edges thereof the holder means including a plurality of thin substantially C-shaped lever members formed of a flexible material, each having an inner circumferential surface for holding a disc-shaped recording media thereon, and each circumferential surface having a radius substantially equal to a radius of the disc-shaped recording media and a recording media insertion diameter smaller than the diameter of the disc-shaped recording media wherein the C-shaped lever member acts as a spring and flexes open when the disc-shaped recording media is inserted and securely holds the media therein upon insertion;

pivot means, disposed within the housing, for pivotally moving the holder means into and out of the housing; and

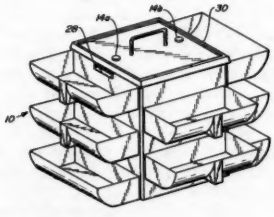
lock means for locking the holder means in the housing.

4,875,744

PARTS ORGANIZER

Ulrich Wettstein, 1281 Andersen Dr., San Rafael, Calif. 94901

Filed Feb. 23, 1988, Ser. No. 159,271
Int. Cl.[4] A47B 49/00
U.S. Cl. 312—266 2 Claims



1. A parts organizer having a plurality of walls bearing vertically spaced trays, said walls operatively connected to interleaf said trays and form a closed unitary structure when in a closed position, said trays having an upwardly curved lower surface, the improvement comprising:

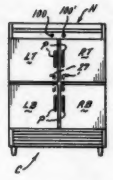
a structural foot portion located generally in the center of said trays and extending from said curved lower surface, wherein said foot portion provides a barrier to and prevents migration of parts between the trays interleaved immediately below said foot.

4,875,745

LATCH FOR COOLER

Arthur W. Trulaske, Chesterfield, Mo., assignor to True Manufacturing Co., Inc., O'Fallon, Mo.

Filed Feb. 23, 1988, Ser. No. 159,383
Int. Cl.[4] A47B 95/00
U.S. Cl. 312—298 8 Claims



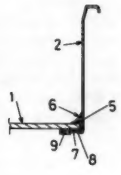
1. In a cooler having two or more doors mounted to a housing of the cooler, the doors being vertically arranged and separately openable and closable and each having an inner face, an improvement comprising conversion apparatus for converting the multiple doors to a single door, the conversion apparatus including a sealing means comprising a multiple channel base element affixed to the inner face of each door and extending around the periphery thereof to form a seal between the door and the housing when the door is closed; and, latch means attachable to the sealing means of one door and the sealing means of an adjacent door to form a rigid connection therebetween whereby the doors operate in unison.

4,875,746

DRAWER ASSEMBLY

Erich Röck, Höchst, and Klaus Brüst[1]e, Lauterach, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed Feb. 10, 1988, Ser. No. 154,215
Claims priority, application Austria, Mar. 5, 1987, 495/87
Int. Cl.[4] A47B 88/00
U.S. Cl. 312—330.1 5 Claims

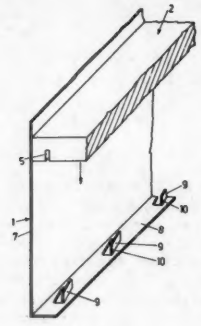


1. In a drawer assembly including a bottom plate and metal side walls on each of opposite sides of said bottom plate, each said side wall having a Z-shaped profile including upper and lower horizontal flanges, said bottom plate being positioned on said lower horizontal flanges of said side walls, and sealing members separate from said side walls, each said sealing member covering a gap between said bottom plate and a respective said side wall, the improvement wherein each said sealing member comprises:

a U-shaped configuration embracing the respective side of said bottom plate and positioned between said bottom plate and the respective said side wall, said U-shaped configuration including a horizontal flange positioned between said bottom plate and said lower horizontal flange of said respective side wall, said horizontal flange

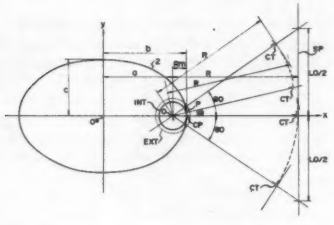
of said sealing member having a free end defining a recess into which is fitted said lower horizontal flange of said respective side wall.

4,875,747
DRAWER
Helmut Hollenstein, Lustenau, Austria, assignor to Julius Blum Gesellschaft m.b.H., Höchst, Austria
Filed Nov. 17, 1988, Ser. No. 272,248
Claims priority, application Austria, Dec. 24, 1987, 3431/87
Int. Cl.[4] A47B *88/00*
U.S. Cl. 312—330.1 5 Claims



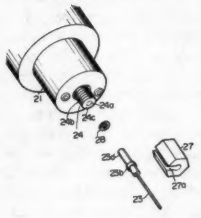
1. A drawer comprising:
metal side walls having vertical flanges which form lateral limitations of said drawer, each said side wall having at a lower part thereof a respective horizontal flange;
a bottom plate abutting on said horizontal flanges, said bottom plate having parallel lateral edges and a pair of longitudinal grooves extending parallel to said lateral edges; and
said horizontal flanges having extending therefrom a plurality of flaps extending into said grooves, said flaps extending obliquely to the longitudinal direction of said grooves, such that opposite end edges of each said flap are pressed into respective spaced walls of said bottom plate that define the respective said groove.

4,875,748
POLYGON MIRROR
Yasuo Matsumoto, Numazu; Kazunori Murakami; Tomonori Ikumi, both of Shizuoka, and Yasuo Iwafune, Tokyo, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan
Filed Jul. 1, 1988, Ser. No. 214,605
Claims priority, application Japan, Jul. 6, 1987, 62-168029
Int. Cl.[4] G02B *26/10*
U.S. Cl. 350—6.8 16 Claims



1. A polygon mirror comprising a plurality of elliptic convex surfaces functioning as light reflection surfaces and each having substantially the same shape as the maximum curvature portion of an ellipse having a long axis b and a short axis c, said elliptic convex surfaces being uniformly arranged on the circumference of an inscribed circle whose center is set on said long axis b, whose radius is Rm, and which is in contact with the maximum curvature portion of said ellipse.

4,875,749
MECHANISM FOR POSITIONING THE LIGHT-RECEIVING END OF AN OPTICAL CONDUCTOR CABLE AT THE FOCAL POSITION OF A LENS
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, and Isao Kosugi, Tokyo, both of Japan, assignors to Kei Mori, Tokyo, Japan
Filed Aug. 29, 1988, Ser. No. 238,023
Claims priority, application Japan, Dec. 28, 1987, 62-334062
Int. Cl.[4] G02B *6/32*
U.S. Cl. 350—96.18 12 Claims



1. A mechanism for positioning the light-receiving end of an optical conductor means at the focal point of a lens comprising a frame means, a lens mounted on said frame means, a holding member mounted on said frame means, said holding member having inner and outer longitudinal ends and an elongated passageway extending between said inner and outer longitudinal ends, said inner end extending into said frame means, an optical conductor means having a longitudinal end portion disposed in said passageway, said optical conductor means having a light-receiving end extending into said frame means and facing said lens such that said light-receiving end receives light rays from said lens, said longitudinal end portion of said optical conductor means having a constant outer diameter along its longitudinal length, positioning means on said optical conductor means having an outer diameter greater than said outer diameter of said longitudinal end portion of said optical conductor means, said outer longitudinal end of said holding member having threaded means thereon, a cap nut mounted on said threaded means, said cap nut having a slit for receiving said optical conductor means such that said cap nut can be slipped over said optical conductor means to a position to engage said threaded means, said cap nut having a transverse wall which is perpendicular to the axis of said elongated passageway and which engages said positioning means on said optical conductor means as said cap nut is threaded on to said threaded means such that said positioning means is disposed between said transverse wall and said outer longitudinal end of said holding member and said cap nut thereby secures said optical conductor means to said holder member with the axial thickness of said positioning means determining the spacing between the light-receiving end of said optical conductor means and said lens.

4,875,750
OPTOELECTRONIC COUPLING ELEMENT AND METHOD FOR ITS MANUFACTURE

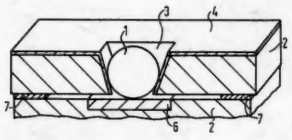
Werner Spaeth, Holzkirchen; Guenther Waitl, Regensburg; Werner Kuhlmann, Munich; Hans-Ludwig Althaus, Lappersdorf; Rolf Birkmann, Laaber; Waltraud Klos, Regensburg, and Axel Schubert, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 2, 1988, Ser. No. 151,372

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1987, 3706103

Int. Cl.[4] G12B 6/32

U.S. Cl. 350—96.18 **6 Claims**



1. An optoelectronic coupling element comprising:
a light wave guide;
a first carrier chip including a semiconductor light transducer;
a microlens for optically coupling the light wave guide and the semiconductor light transducer, wherein the microlens is a spherical lens;
a second silicon carrier chip defining a truncated pyramid-shaped lens receptacle, wherein the first carrier chip is fixed to the second carrier chip such that the semiconductor light transducer is adjacent to the microlens, and the lens receptacle is anisotropically etched into the second carrier chip; and
glass solder means for fixing the microlens in the lens receptacle.

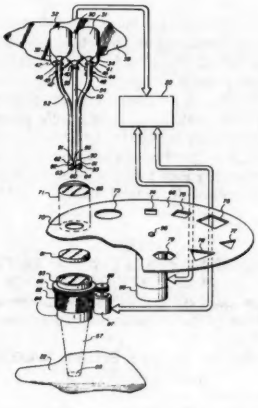
4,875,751
LOW LOSS PHOTOPLOTTER IMAGING SYSTEM

Bruce H. Ostermeier, Fairfield, Calif., assignor to AM International Corporation, Chicago, Ill.

Filed Jul. 20, 1987, Ser. No. 75,443

Int. Cl.[4] G02B 6/32

U.S. Cl. 350—96.18 **24 Claims**



1. For use in a photoplotter in which a source of imaging light beam is supported upon a movable carriage and is directed to a photosensitive media to expose a latent image thereon, an imaging system operative without a shutter mechanism providing a light beam having rapid rise and fall times relative to carriage motion, said imaging system comprising:
a plurality of light emitting diodes each capable of producing a light output turned on and off solely by applied electrical signals;
a fiber-optic link having a first end optically coupled to said plurality of light emitting diodes and a second end;
lens means optically coupled to said second end of said fiber optic link; and
aperture means, interposed between said second end of said fiber optic link and said lens means, including an opaque member defining a light transparent aperture.

4,875,752
OPTICAL SEMICONDUCTOR MODULE USING DUMMY FERRULE

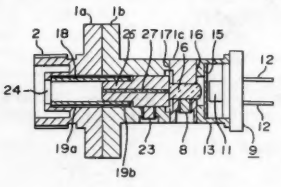
Akinobu Suzuki, Kamakura, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 12, 1988, Ser. No. 155,517

Claims priority, application Japan, Feb. 13, 1987, 62-19527; Mar. 5, 1987, 62-32127

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.2 **5 Claims**



1. An optical semiconductor module comprising an optical semiconductor assembly having a light transmitting aperture, a housing having a joint surface at its one end to be joined to said optical semiconductor assembly, an outer male screw portion and a first hole means for receiving an optical fiber supporter at its other end, a lens held in a second hole means formed in said housing so as to be in communicative alignment with said light transmitting aperture and said first hole means, characterized by comprising a slitted sleeve placed in a hole communicated with said first hole means and a dummy ferrule placed in said communicated hole of said housing, with an axially extending central bore for passing light, which is placed between said first hole means and said lens so that one end portion of said dummy ferrule is inserted in said slitted sleeve so as to be in contact with said optical fiber supporter when it is fitted.

4,875,753
FIBER OPTIC CONNECTORS

Vasilios E. Kalomiris, 20 Line Rd., Holmdel, N.J. 07733

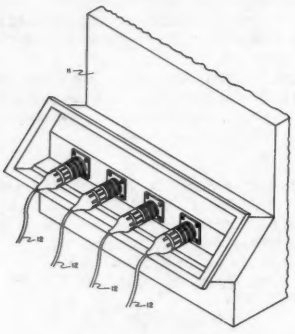
Filed Jul. 2, 1986, Ser. No. 880,511

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 **12 Claims**

12. In combination, equipment means providing electronic messages of various predetermined types and classifications, a plurality of fiber optic cables for carrying respective messages between said equipment means and one or more remote locations, said equipment means having a plurality of output ports to which said fiber optic cables are respectively connected, each fiber optic cable having at least two optical fibers and a separate and individual connector assembly at each end thereof, each connector assembly of a given cable having the very same keying insert end plug with an end face configura-

tion that is unique to said given cable, said end face configuration having one or more sections that are axially recessed with respect to one or more other sections thereof, the plurality of cables having unique keying insert end plugs in their respective connector assemblies different from those of the other connector assemblies, each of said plurality of output ports having a bulkhead connector assembly with a keying insert end plug of



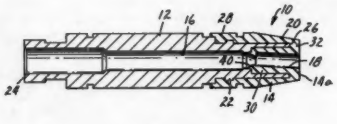
end face configuration that is unique to a given output port, each bulkhead assembly keying insert being of a different end face configuration from those of the other bulkhead assembly keying inserts, each bulkhead connector assembly having a keying insert which is identical to the keying insert of a selected cable so that each bulkhead connector assembly matches and mates with one, and only one, cable connector assembly.

4,875,754

OPTICAL FIBER CONNECTOR

Ram A. Rao, Middletown; Mogens Kofod, Howell; Julius Puchammer, and George Galiotti, both of Edison, all of N.J., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 28, 1987, Ser. No. 90,790
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.20 **28 Claims**



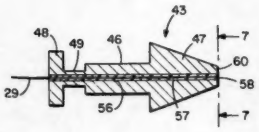
1. An optical fiber connector, comprising:
(a) an elongate plug support member having an interior bore extending between opposed first and second ends thereof;
(b) a plug circumscribing a portion of said plug support member adjacent said second end thereof, extending therewithin and also being longitudinally outward of said second end, said plug defining an interior bore extending therethrough into communication with said plug support member bore; and
(c) an insert disposed in said plug interior bore and successively radially circumscribed by said plug and said plug support member, said insert defining an interior passage for receiving an optical fiber and centering same with respect to said plug interior bore.

4,875,755

FIBER OPTIC CONNECTOR ASSEMBLY AND METHOD OF MAKING SAME

John A. Borgos; Francis Bradac, both of St. Paul; Daniel J. Haumschild, Coon Rapids; Timothy Johnson, New Brighton, all of Minn., and Rebecca Lee, Albuquerque, N. Mex., assignors to TSI Incorporated, St. Paul, Minn.

Division of Ser. No. 907,086, Sep. 15, 1986, Pat. No. 4,772,081.
This application Aug. 1, 1988, Ser. No. 226,825
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 **14 Claims**



1. An optical fiber connector assembly for coupling an optical fiber cable having at least one optical fiber to a support associated with means for transmitting or receiving light comprising: a housing, means releasably connecting said housing to said support to hold said housing in engagement therewith, said housing having means to connect an optical fiber cable thereto and passage means for accommodating an optical fiber of said cable, ferrule means mounted on said housing for supporting the optical fiber, sand ferrule means including a head having a cone-shaped outer surface, a flat forward end, and a longitudinal hole through said head open to said forward end, said optical fiber extended through said hole, means in said hole securing the optical fiber to said ferrule means to fix the position of the optical fiber relative to the ferrule means, said optical fiber having an end polished smooth and flush with said flat forward end of the head, said cone-shaped outer surface of the head being precision ground after the optical fiber has been secured to the ferrule means to concentrically locate said cone-shaped outer surface of the head about said end of the optical fiber, and receptacle means having a cone shaped recess complementary in size and shape to the cone-shaped outer surface of the head, said cone-shaped recess being aligned with and open to a means for transmitting or receiving light, said head being located in said cone-shaped recess with said cone-shaped outer surface of the head cooperating with the cone-shaped recess to locate the end of the optical fiber in precise radial alignment with said means for transmitting or receiving light.

11. A method of making a ferrule for an optical fiber connector assembly, said ferrule having a head with a forward end and conical outer surface, and an optical fiber longitudinally secured to said ferrule, said fiber having an end flush with said forward end comprising: forming a longitudinal hole through the center of the ferrule, locating an optical fiber in said longitudinal hole, securing said fiber to the ferrule, polishing the end of the optical fiber until it is smooth and flush with a forward end of the head, and grinding the conical outer surface of the head to concentrically locate said conical outer surface of the head about said end of the optical fiber.

4,875,756

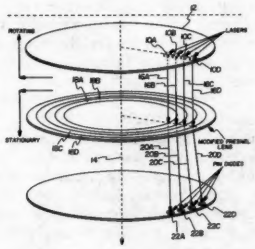
FRESNEL LENS APPARATUS FOR OPTICALLY COUPLING A PLURALITY OF DATA CHANNELS

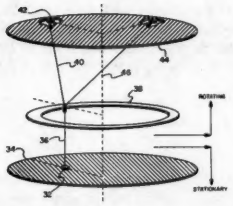
Marvin F. Estes, Oakfield, and Arnold W. Lungershausen, West Henrietta, both of N.Y., assignors to Eastman Kodak Co., Rochester, N.Y.

Filed Sep. 27, 1988, Ser. No. 249,819
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 **6 Claims**

1. Optical data signal apparatus comprising: an optical data signal transmitter, an optical data signal receiver, and means

for mounting said transmitter and said receiver for relative rotation with respect to one another about a rotational axis in a plane which is perpendicular to said rotational axis, wherein said transmitter and said receiver are axially spaced from one another and each of which is radially spaced from said axis; and





a substantially planar, fresnel optical coupling element which is spaced from and located between said transmitter and said receiver, which has a central axis coincident with said rotational axis and which causes a collimated optical data signal, which is transmitted by said transmitter along a first path to said element, to be focused along a second path to said receiver.

4,875,757

OPTICAL CABLE

Johannes Greveling, Saskatoon, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Continuation-in-part of Ser. No. 877,064, Jun. 23, 1986, Pat. No. 4,763,982. This application May 20, 1988, Ser. No. 196,525

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **6 Claims**

1. An optical cable having a plurality of optical fibers, a cable jacket and a tubular cable tensile strength member surrounding the plurality of fibers as a group, the tubular cable tensile strength member comprising a plurality of glass filaments with gaps between adjacent filaments filled by a rigid material holding the filaments in their relative positions in which the filaments extend side-by-side longitudinally of the cable, the glass filaments occupying more volume of the tube than is occupied by the rigid material, and the cable jacket extruded onto and contacting the tensile strength member with tensile strength member having an inner diameter greater than the combined diameters of the fibers of the group whereby each fiber is radially movable within the tube.

4,875,758

PLASTIC-COATED OPTICAL TRANSMISSION FIBER AND AN ESTIMATING METHOD THEREOF

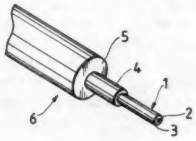
Shigeo Masuda, and Toshifumi Hosoya, both of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Dec. 28, 1988, Ser. No. 291,292

Claims priority, application Japan, Dec. 28, 1987, 62-334265; Jan. 8, 1988, 63-3021

Int. Cl.[4] G02B *5/172*

U.S. Cl. 350—96.30 **5 Claims**



1. An optical transmission line, comprising:

a glass fiber; and

a coating of an organic matter covering said class fiber, said glass fiber and said coating of said organic matter being in sufficiently close contact that the lower limit of temperature at which a dynamic loss (tan δ) begins to indicate 0.05 or more is not higher than 60° C. when dynamic viscoelasticity is measured in a manner so that dynamic vibrations are applied to one end and stress is detected at the other end of said optical-transmission fiber.

4,875,759

OPTICAL FIBER AND METHOD OF PRODUCING THE SAME

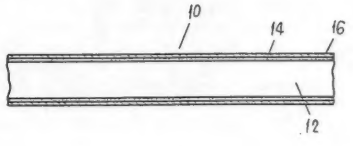
Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 799,452, Nov. 18, 1985, abandoned. This application Feb. 16, 1988, Ser. No. 158,111

Claims priority, application Japan, Nov. 19, 1984, 59-243676

Int. Cl.[4] G02B *6/00*

U.S. Cl. 350—96.34 **8 Claims**



1. An optical fiber comprising:

a core;

a clad formed on said core; and

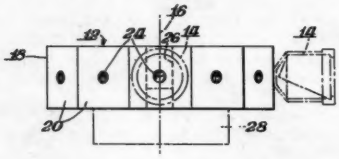
a protection layer formed on said clad, said protection layer being a monomolecular film of a silane surface active agent of the formula $CH_2{=}CH{-}(CH_2)_n{-}SiCl_3$ in which n is an integer.

4,875,760

REFLECTIVE PRISM ASSEMBLY

John H. Youngren, and David J. Youngren, both of 4516 Abbott Ave., Robbinsdale North, Minn. 55422

Filed May 13, 1988, Ser. No. 193,892
Int. Cl.[4] G02B 5/122, 7/18
U.S. Cl. 350—102 18 Claims



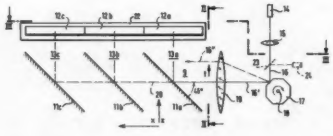
1. A 360° reflective prism assembly comprising a generally plate-like mounting member having a central vertical axis and a peripheral surface portion defining an outer horizontal boundary of the mounting member, the peripheral surface portion of the plate-like mounting member including at least ten flat vertical faces equally angularly spaced from each other around the mounting member, and a plurality of equally spaced apart reflecting prisms arranged around the mounting member, one prism releasably attached to each flat face.

4,875,761

LIGHT CURTAIN APPARATUS

Günter Fetzer, Gundelfingen, Fed. Rep. of Germany, assignor to Erwin Sick GmbH Optik-Electronik, Waldkirch, Fed. Rep. of Germany

Filed Oct. 15, 1987, Ser. No. 109,131
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1986, 3635271
Int. Cl.[4] G02B 26/10
U.S. Cl. 350—171 4 Claims



1. In a three dimensional cartesian space having mutually orthogonal x, y and z directions, a light curtain apparatus for generating a relatively broad, relatively thin light curtain, lying in a single plane, from a relatively narrow, relatively thick light curtain, and for directing said generated light curtain through a monitored region, the apparatus comprising:

means for projecting a light curtain in the x direction, said light curtain having a width extending in the z direction and a thickness extending in the y direction;

a plurality of strip mirrors, arranged one strip mirror behind another in the x direction at an angle to the x direction, each strip mirror being laterally displaced in the y direction relative to a preceding strip mirror, each strip mirror reflecting a full width of the projected light curtain but only a portion of the thickness thereof through an angle of substantially 90 degrees into said z direction, forming thereby a plurality of reflected light curtain portions arranged in a row extending in the x direction, each said reflected light curtain portion being laterally displaced in the y direction relative to a preceding reflected light curtain portion, a total width of a row of reflected light curtain portions in the z direction corresponding to a width of said projected light curtain multiplied by the number of said strip mirrors;

a plurality of strip-like deflecting mirrors, each said deflecting mirrors extending in the x direction;

a respective strip-like deflecting mirror being associated with each said strip mirrors;

said strip-like deflecting mirrors being arranged in planes parallel to one another and displaced in the y direction in the manner of said strip mirrors, said striplike deflecting mirrors having no displacement in the z direction;

each said deflecting mirror having a normal to its surface, each said normal forming a respective angle of 45 degrees with the z direction, and in a plane parallel to a plane defined by said y and z directions; and

whereby said deflecting mirrors deflect individual reflected light curtain incident thereon, which are displaced in accordance with the displacement of the first said strip mirrors, into a common plane parallel to a plane defined by the x and y directions, for transmission through said monitoring region as said relatively broad and relatively thin light curtain, thereby eliminating displacement of the reflected light curtains resulting from said lateral displacement of said first strip mirrors.

4,875,762

PHOTOCHROMIC-ELECTROCHROMIC INTERCALATION COMPOUND

Chuzo Kato, and Kazuyuki Kuroda, both of Tokyo, Japan, assignors to Osaka Yuki Kagakuo Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 8, 1988, Ser. No. 179,321
Claims priority, application Japan, Apr. 8, 1987, 62-84622
Int. Cl.[4] G02F 1/17
U.S. Cl. 350—357 6 Claims

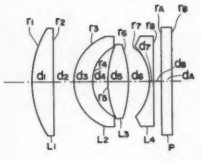
1. A photochromic-electrochromic intercalation compound synthesized by intercalating an organic compound exhibiting photochromism and electrochromism in combination with an electron donor between crystal layers of a natural clayish material.

4,875,763

VIDEO PROJECTOR LENS SYSTEM

Kazuo Yamakawa, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 4, 1986, Ser. No. 937,968
Claims priority, application Japan, Dec. 11, 1985, 60-279923
Int. Cl.[4] G02B 13/18
U.S. Cl. 350—432 10 Claims



1. A lens system for projecting onto a screen a video image formed on a face plate of a cathode ray tube comprising, from the screen side to the tube side;

a first positive lens having a screen side convex surface;

a second negative meniscus lens having a screen side convex surface;

a third bi-convex lens made of a glass material; and

a fourth negative lens having a screen side concave surface;

wherein the lens system includes at least one aspheric surface and fulfills the following condition;

$$|f_2/f| > 8$$

$$f_2/r_3 < -6$$

wherein:

f represents a focal length of the whole lens system;

f_2 represents a focal length of the second lens; and

r_3 represents a radius of curvature of the screen side surface of the second lens.

4,875,764

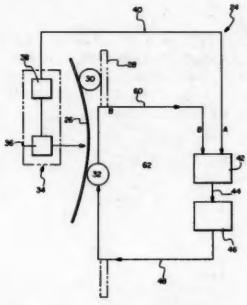
ASSEMBLY FOR CORRECTION OF DISTORTIONS OF A MIRROR

Philip F. Marino, Rochester, and Donald E. Vandenberg, Brockport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 29, 1988, Ser. No. 225,901

Int. Cl.[4] G02B 7/18

U.S. Cl. 350—611 24 Claims



1. An assembly comprising:

(a) a base structure;

(b) a mirror;

(c) at least one position actuator for positioning the mirror with respect to the base structure; and

(d) at least one force actuator, each of which force actuators can generate a desired controlled force for application to the mirror, and wherein each force actuator comprises a closed feedback loop that closes around the force actuator, so that, in response to a disturbance to the force actuator, the feedback loop maintains the desired controlled force.

4,875,765

METHOD FOR CORRECTION OF DISTORTIONS OF A MIRROR

Donald E. Vandenberg, Brockport; Donald A. Jacques, Pittsford, and William E. Schaffer, Spencerport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 29, 1988, Ser. No. 226,339

Int. Cl.[4] G02B 5/10, 7/18

U.S. Cl. 350—611 6 Claims

1. A method for providing corrections of mirror aberrations, the method comprising the steps of:

(a) applying a first force matrix $[F_W]$ to the mirror for introducing first deformations that act to cancel out a global mirror aberration;

(b) forming a non-singular correction matrix CM comprising at least one column vector, wherein a column vector is dedicated to the global mirror aberration and includes at least one matrix element that carries information on the global mirror aberration, and at least one matrix element that carries information on undesired mirror aberrations induced by applying the first force matrix $[F_W]$;

(c) forming a participation factor [PF] matrix by inverting the correction matrix, for eliminating the undesired mirror aberrations; and

(d) generating a product matrix $[PF].[F_W]=[F_W]'$, for producing a second force matrix $[F_W]'$ for applying to the mirror second deformations.

4,875,766

FIBER REINFORCED PLASTIC REFLECTOR

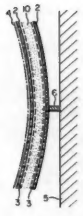
Hisayo Shimodaira; Toshio Ono, both of Sagamihara; Keizo Miyawaki, and Tatsuya Hamaguchi, both of Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 8, 1987, Ser. No. 71,209

Claims priority, application Japan, Jul. 18, 1986, 61-169153; Aug. 8, 1986, 61-186438; Aug. 8, 1986, 61-186439; Oct. 3, 1986, 61-235695; Oct. 3, 1986, 61-235696; Oct. 3, 1986, 61-235697

Int. Cl.[4] G02B 5/08, 7/18

U.S. Cl. 350—641 9 Claims



1. A fiber reinforced plastic reflector comprising:

a core which is made of an isotropic material with respect to mechanical and thermal properties selected from a uniform foamed metal having a density of 0.1–1.0 g/cm^3, uniform porous glass having a density of 0.05–1.0 g/cm^3, and a uniform porous ceramic having a density of 0.3–1.0 g/cm^3;

two fiber reinforced plastic plates which are secured to opposite sides of the said core; and

a reflecting film which is formed atop the outer surface of one of said fiber reinforced plastic plates;

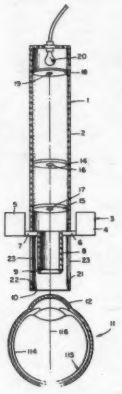
said core and said plastic plates having a linear thermal expansion coefficient of $\leqq 1\times10^{-5}$/C. and providing a lightweight reflector not subject to significant thermal deformation.

4,875,767

APPARATUS AND METHODS FOR MARKING THE VISUAL CENTER OF THE CORNEA OF A HUMAN EYE

Kenneth W. Wright, 1375 Pasqualito Dr., San Marino, Calif. 91108

Filed Mar. 3, 1988, Ser. No. 163,799
Int. Cl.[4] A61B 3/10, 3/02
U.S. Cl. 351—212 14 Claims



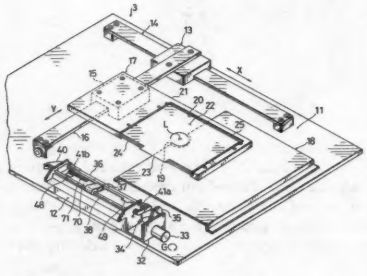
1. An apparatus for identifying and marking the visual center of a cornea of a user includes cylindrical tube means, said tube being open at one end, and having inside said tube, sighting means positioned for permitting said user looking into the device to align the fovea and visual axis of his eye with said sighting means, and means coxial with said tube means for marking said visual center on the epithelium of said cornea.

4,875,768

MICROFICHE READING APPARATUS

Hideaki Hirasawa, and Nobuo Ueda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 1, 1988, Ser. No. 176,755
Claims priority, application Japan, Apr. 3, 1987, 62-83377; Apr. 3, 1987, 62-83379
Int. Cl.[4] G03B 23/08
U.S. Cl. 353—27 A 20 Claims



1. A microfilm retrieving apparatus for retrieving a desired frame from a plurality of frames recorded on a microfiche film, comprising:

optical means including a light source and a projecting lens for projecting micro-images of the frames;

microfilm support means for supporting the microfiche film and movable longitudinally and transversely on a plane substantially perpendicular to a projecting optical path of said optical means;

drive means for moving said support means;

read means for reading coded information which includes index information indicative of an address of an index frame on the microfiche film and other information relating to a format of the microfiche film, said coded information being provided in a region outside the micro-images on the microfiche film;

command generating means for generating an index command; and

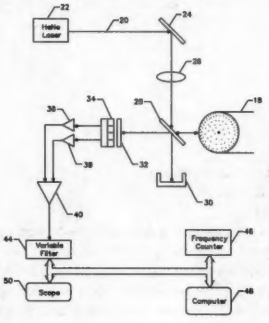
control means for controlling said drive means in accordance with the format information read by said read means for retrieving the desired frames on the projecting optical path, wherein said control means retrieves the index frame of the microfiche film on the projecting optical path in response to said index command.

4,875,769

VELOCIMETER FOR A PRINTING PRESS WEB

Randolph S. Linebarger, Newbury Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 22, 1988, Ser. No. 146,945
Int. Cl.[4] G01P 3/36; G01N 21/86
U.S. Cl. 356—28 8 Claims



1. A velocimeter for a printing press web, comprising:

a source of coherent light positioned to reflect light off a printing press web;

a laser bandpass filter positioned to receive the light reflected off the web;

a linear photodetector array positioned to detect web motion using a speckle pattern produced by the filtered light, the individual photodetectors being differentially connected;

photodetector electronics for receiving the outputs of the photodetector array and for providing amplified and buffered outputs;

a differential amplifier for receiving the outputs of the photodetector electronics and for providing an amplified differenced output;

a variable filter which receives the amplified differenced output and provides a filtered output, the variable filter having a bandpass center frequency and bandwidth which can be varied;

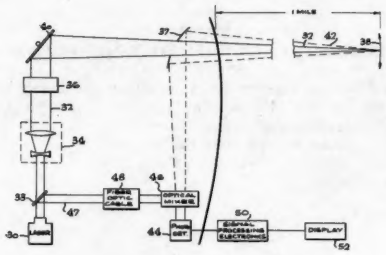
a frequency counter which receives the filtered output and provides an output which is related to the frequency of the filtered output; and

means coupled to the variable filter and to the frequency counter for controlling the bandpass center frequency and bandwith to provide a substantially linear response of web velocity vs counter frequency.

4,875,770
WIND SHEAR DETECTOR

Philip L. Rogers, Granada Hills, Calif., and Milton Rogers, Baltimore, Md., assignors to Lockheed Corporation, Calabasas, Calif.

Filed Mar. 23, 1987, Ser. No. 28,840
Int. Cl.[4] G01C *3/08*
U.S. Cl. 356—28.5 **13 Claims**

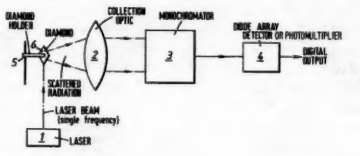


1. A wind velocity gradient detection system comprising:
means for generating a beam of radiant energy;
an optical system coupled to said beam for directing a first portion of said beam over multiple predetermined distances to a scatterer of radiant energy;
multiple means coupled to said beam for conducting a second portion of said beam through a polarization medium, each of said multiple means having a length substantially matching one of said multiple predetermined distances;
means for mixing said second portion with said radiant energy reflected by said scatterer; and
means coupled to said means for mixing for measuring a component of the velocity of said scatterer.

4,875,771
METHOD FOR ASSESSING DIAMOND QUALITY

Heather J. Bowley, Staines, and Donald L. Gerrard, West Ewell, both of England, assignors to The British Petroleum Company p.l.c., London, United Kingdom

PCT No. PCT/GB86/00784, § 371 Date Aug. 6, 1987, § 102(e) Date Aug. 6, 1987, PCT Pub. No. WO87/03963, PCT Pub. Date Jul. 2, 1987
PCT Filed Dec. 19, 1986, Ser. No. 91,065
Int. Cl.[4] G01J *3/44*; G01N *21/65, 21/87*
U.S. Cl. 356—30 **11 Claims**

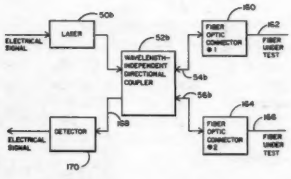


1. A method for assessing diamonds of differing quality comprising the steps:
(a) calibrating a laser Raman spectrometer with diamonds of known quality characteristics, said spectrometer having a source of laser radiation, means for holding a diamond in a fixed orientation so that it may be irradiated with said radiation, and means for monitoring the intensity of scattered Raman radiation from said diamond, said calibration for each diamond of known quality characteristics comprising the steps: holding said diamond in a fixed orientation in said spectrometer, irradiating said diamond with laser radiation, and monitoring the intensity of scattered Raman radiation from said diamond,
(b) holding a diamond of unknown quality characteristic in a fixed orientation in said spectrometer,
(c) irradiating said diamond of unknown quality characteristics with laser radiation of known frequency and intensity from said source of laser radiation,
(d) monitoring the intensity of scattered Raman radiation from said diamond of unknown quality characteristics for one or more orientations of said diamond, and
(e) comparing the intensity of said scattered Raman radiation from said diamond of unknown quality characteristics with the intensities for said diamonds of known quality characteristics.

4,875,772
REMOTELY CONTROLLED OPTICAL TIME DOMAIN REFLECTOMETER SERVING A PLURALITY OF FIBER OPTIC CABLES

John R. Gentile, Frankfort, N.Y., assignor to Laser Precision Corporation, Utica, N.Y.

Filed Oct. 4, 1988, Ser. No. 253,088
Int. Cl.[4] G01N *21/88*
U.S. Cl. 356—73.1 **11 Claims**



11. The method of using a single optical time domain reflectometer to monitor faults in a plurality of fiber optic cables, which comprises:
including first and second fiber optic test strands in separate cables;
the first test strand being longer than the second test strand;
sending a laser signal through a directional coupler simultaneously into the first and second test strands;
directing the returning reflections through the directional coupler to a detector;
summing the returning reflections from the two test strands to provide a display graph of the summed reflections; and
if a fault occurs in either the first or second test strand, determining from their summed display whether the fault is in the first or second test strand.

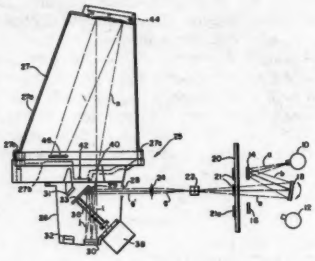
4,875,773
OPTICAL SYSTEM FOR A MULTIDETECTOR ARRAY SPECTROGRAPH

Richard Burns, Webster; James Defendorf, Rochester; Edward King, Fairport, and Cornelius McCarthy, Pittsford, all of N.Y., assignors to Milton Roy Company, St. Petersburg, Fla.

Filed May 6, 1988, Ser. No. 191,262
Int. Cl.[4] G01J *3/18*
U.S. Cl. 356—328 **32 Claims**

1. An instrument for analyzing intensity variation as a function of wavelength of light, comprising:
a plurality of entry ports, each said entry port corresponding to a wavelength range of light;
detector means sensitive to said wavelength ranges of said light for producing a signal indicative of light intensity;
dispersing and focusing means optically coupled to said detector means for dispersing light emerging from said plural entry ports by wavelength and focusing said dispersed wavelengths onto said detector means, the position of said entry ports relative to said dispersing and focusing

means effecting optimum focus of the specific wavelength range of light for each said entry port at said detector means; and



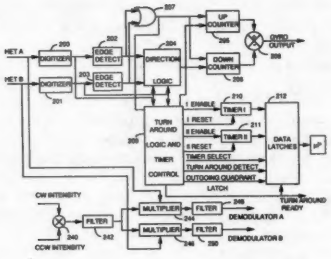
means for selectively directing wavelength ranges of said light to said entry port corresponding to a wavelength range of light and for delivering light to a selected entry port position optimally with respect to intensity, orientation and said wavelength range of said light.

4,875,774

APPARATUS AND METHOD FOR DETERMINING RING LASER GYROSCOPE PHASE AT TURNAROUND

Daniel A. Tazartes, Beverly Hills; John G. Mark, Pasadena, and Anthony Matthews, Calabassas, all of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 2, 1988, Ser. No. 189,047
Int. Cl.[4] G01C *19/64*
U.S. Cl. 356—350 **18 Claims**



1. A system for compensating for turnaround phase errors in measurements of rotations with a dithered ring laser gyroscope that includes a frame having a cavity therein for guiding a pair of counterpropagating light beams and means for producing a pair of heterodyne signals that are processed to determine an angle of rotation, comprising:

means for determining the direction of rotation of the frame;

means for detecting turnarounds in direction of rotation of the frame;

means for determining the heterodyne phase at each turnaround;

means for determining the heterodyne phase acceleration at each turnaround;

means for determining the amplitude of backscattered light in the cavity;

means for determining the phase of backscattered light in the cavity; and

means for calculating a phase correction to compensate for turnaround-induced errors in measurements of phase differences between the two beams using the equation

$$\psi = -D\sqrt{\frac{2\pi}{|\alpha_0|}}\ \sin\left(\Psi_0 + \phi \pm \frac{\pi}{4}\right),$$

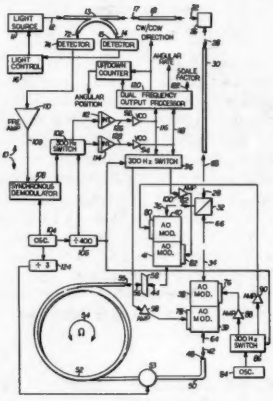
where D=backscattered light amplitude, α_0=heterodyne phase acceleration at turnaround, Ψ_0=heterodyne phase at turnaround, and ϕ=phase of backscattered light.

4,875,775

RECIPROCALLY SWITCHED FOUR MODULATOR SYSTEM

Ronald J. Michal, Orange; Eric Udd, Huntington Beach, and Richard F. Cahill, El Toro, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Aug. 20, 1984, Ser. No. 642,144
Int. Cl.[4] G01B *9/02*; G01N *21/41*
U.S. Cl. 356—350 **50 Claims**



1. A modulator assembly for modulating first and second light beams counterpropagating in a light conduit, said assembly including:

a first frequency shifting modulator pair having:

first and second modulators;

a first end for receiving the first light beam; and

a second end facing the light conduit;

a second frequency shifting modulator pair having:

third and fourth modulators;

a first end for receiving the second light beam; and

a second end facing the light conduit;

first oscillator means connected to apply as the frequency shifting input a first oscillator signal alternately between said first modulator of said first frequency shifting modulator pair and said third modulator of said second frequency shifting modulator pair;

second oscillator means connected to switch a second oscillator signal as the frequency shifting input to said fourth modulator of said second frequency shifting modulator pair when said first oscillator means are applying said first oscillator signal to said first modulator of said first frequency shifting modulator pair; and

third oscillator means connected to switch a third oscillator signal as the frequency shifting input to said second modulator of said first frequency shifting modulator pair when said first oscillator means are applying said first oscillator signal to said third modulator of said second frequency shifting modulator pair.

4,875,776

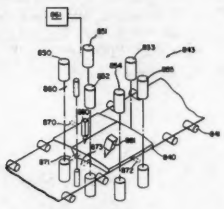
ELECTRO-OPTICAL INSPECTION

Timothy R. Pryor, Tecumseh, Canada, assignor to Diffracto Ltd., Windsor, Canada

Continuation of Ser. No. 815,270, Dec. 24, 1985, abandoned, which is a continuation of Ser. No. 531,216, Aug. 26, 1983, abandoned, which is a division of Ser. No. 269,614, Jun. 2, 1981, Pat. No. 4,576,482, which is a continuation of Ser. No. 73,226, Sep. 3, 1979, abandoned. This application May 5, 1987, Ser. No. 48,501

Int. Cl.[4] G01B *11/00*; B07C *5/10*

U.S. Cl. 356—372 5 Claims



1. Apparatus for inspecting a workpiece comprising:

electro-optical sensor means for sensing the positions of a plurality of edge portions of a workpiece in an inspection location, said electro-optical sensor means comprising:

light source means for illuminating a plurality of edge portions of a workpiece in said inspection location; lens means for forming an image of each of said illuminated edge portions; and a plurality of photosensitive arrays, each array comprising a plurality of light sensitive elements capable of producing an electrical signal in response to light incident thereon, each array being positioned to receive an image of a respective illuminated edge portion of a workpiece;

means for analyzing the signals from said light sensitive elements to determine a dimension of said workpiece; and

further sensor means for determining the position of a workpiece in said inspection location, said further sensor means comprising

light source means for illuminating a plurality of known portions of a workpiece in said inspection location, lens means for forming an image of each of said illuminated known portions and a plurality of photosensitive arrays, each array comprising a plurality of light sensitive elements capable of producing a signal in response to light incident thereon, each of said arrays being positioned to receive an image of a respective illuminated known portion of said workpiece in said inspection location, and means for analyzing the signals from said light sensitive elements of said further sensor means to determine the position of a workpiece in said inspection location.

4,875,777

OFF-AXIS HIGH ACCURACY STRUCTURED LIGHT PROFILER

Kevin G. Harding, Ann Arbor, Mich., assignor to Industrial Technology Institute, Ann Arbor, Mich.

Filed Sep. 30, 1987, Ser. No. 103,497

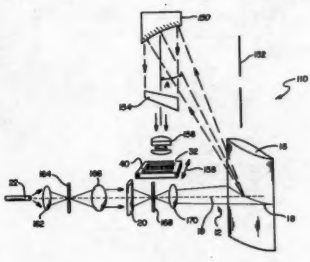
Int. Cl.[4] G01B *11/24*

U.S. Cl. 356—376 12 Claims

1. An optical gauging system for evaluating the surface shape of a workpiece along a cross-section comprising:

illumination means for projecting a sheet of light onto said workpiece along an illumination optical axis,

viewing means for imaging said sheet of light on said workpiece having an optical axis perpendicular to said illumination optical axis and the plane defined by said sheet of light, and wherein rays of light from said workpiece surface illuminated by said sheet of light are received by said viewing means off axis with respect to said viewing means optical axis such that none of said rays are directed along said viewing means optical axis whereby said sheet of light



lies within a single depth-of-field plane of said viewing means, said viewing means including an off axis concave mirror, and

detector means for sensing the image of said sheet of light on said workpiece formed by said viewing means.

4,875,778

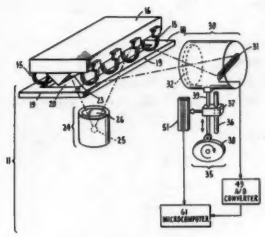
LEAD INSPECTION SYSTEM FOR SURFACE-MOUNTED CIRCUIT PACKAGES

Richard J. Luebbe, 6179 Paso Los Cerritos, San Jose, Calif. 95120, and H. Kenneth Hopkins, 114 Rollingwood Dr., Boulder Creek, Calif. 95006

Continuation-in-part of Ser. No. 153,764, Feb. 8, 1987. This application Apr. 25, 1988, Ser. No. 185,838

Int. Cl.[4] G01B *11/00*

U.S. Cl. 356—394 24 Claims



1. A process for inspecting leads on circuit packages of the surface-mounted type, comprising the steps of:

positioning a circuit package for inspection on a generally horizontal reference surface having at least one horizontal reference edge;

illuminating the package to produce sharp optical contrast at the edges and contact ends of the leads;

moving a horizontally-arranged linear array of photosensitive elements in a direction substantially perpendicular to the reference edge;

operating the horizontally-arranged linear array of photosensitive elements to provide a series of one-dimensional scans horizontally across the leads; and

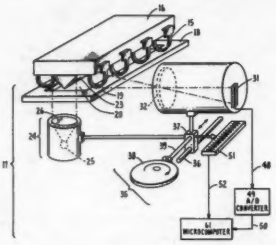
analyzing signal information obtained from the horizontal scans to detect and measure selected geometrical properties of the inspected leads.

4,875,779

LEAD INSPECTION SYSTEM FOR SURFACE-MOUNTED CIRCUIT PACKAGES

Richard J. Luebbe, 6179 Paso Los Cerritos, San Jose, Calif. 95120, and H. Kenneth Hopkins, 114 Rollingwood Dr., Boulder Creek, Calif. 95006

Filed Feb. 8, 1988, Ser. No. 153,764
Int. Cl.[4] G01B *11/00*
U.S. Cl. 356—394 29 Claims



1. A process for inspecting leads on circuit packages of the surface-mounted type, comprising the steps of:

positioning a circuit package for inspection on a generally horizontal reference surface having a reference edge that parallels the surface;

providing illumination of the package leads to produce sharp-contrast at the edges and contact ends of the leads;

moving a vertically-arranged linear array of photosensitive elements parallel to the reference edge;

operating the array of photosensitive elements to provide a series of one-dimensional optical samples vertically along the leads; and

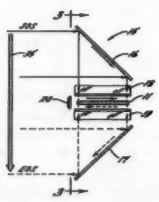
analyzing signal information obtained from the optical samples to detect and measure selected geometrical properties of the inspected leads.

4,875,780

METHOD AND APPARATUS FOR INSPECTING RETICLES

Kevin E. Moran, Belmont; Michael L. Smith, Matthews, and Ernest R. Lippard, III, Charlotte, all of N.C., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 25, 1988, Ser. No. 160,194
Int. Cl.[4] G01N *21/47*
U.S. Cl. 356—446 46 Claims



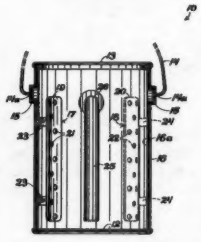
1. A laser scanning system for inspecting opposite surfaces of a workpiece, said system comprising means for transporting a workpiece along a material path, laser light generating means for generating a laser light beam, scan generating means arranged to receive said laser light beam and to repeatedly scan the laser light beam along a predetermined scan path, a timing sensor positioned in said scan path to sense the laser light beam crossing the position of said timing sensor, means positioned in said scan path for receiving said laser light beam and for dividing said laser light beam into a first sweeping inspection scan oriented toward one side of said material path and a second sweeping inspection scan oriented toward the opposite side of said material path, means arranged to receive each of said first and second sweeping inspection scans and to direct the same at a low angle of incidence to said material path, and means arranged adjacent said opposite sides of said material path for collecting light reflected from a workpiece in said material path.

4,875,781

PAINT MIXING PAINT CONTAINER

Jack C. Raska, 29249 32 Mile Rd., Richmond, Mich. 48062

Filed May 19, 1988, Ser. No. 196,054
Int. Cl.[4] B01F *9/10*
U.S. Cl. 366—130 6 Claims



1. A paint container for the mixing of paint contained within the container comprising,

a cylindrical container having an interior surface and including a removable overlying lid, the container further including a continuous vertical wall integrally secured to a floor parallel to said lid, and

a handle means including two terminal ends pivotally secured to the vertical wall of said container, and

a plurality of arcuate vane means integrally secured to the interior surface of said container means for operative cooperation with rotary motion of said handle means for mixing of paint within said container, and

wherein said handle means is formed as an arcuate handle terminating in respective orthogonal ends secured to said container at diametrically opposed positions, and

wherein said vane means include two arcuate vanes of a height less than that of said wall of said paint container secured to the interior surface defined by said vertical wall, and

wherein each of said vanes terminate in upper terminal ends aligned with said handle ends, and

lower terminal ends of each of said vanes terminate at a position above said floor, and

wherein each of said vanes defines an arcuate configuration equal to that of the radius of curvature of the cylindrical wall of said paint container.

4,875,782

AUTOMATED TEMPERATURE PROBE APPARATUS AND METHOD

Steve A. Fox, Hickory, N.C., assignor to Normag Corporation, Hickory, N.C.

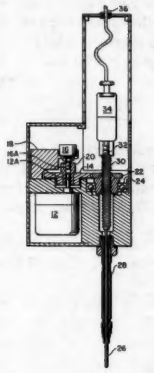
Filed Jan. 25, 1988, Ser. No. 147,525
Int. Cl.[4] G01K *7/04, 13/02*
U.S. Cl. 374—148 14 Claims

1. An automated temperature probe for accurately determining by temperature measurements the temperature profile of a viscous material flow by traversing at least a portion of the

flow and determining the temperature and corresponding position at a plurality of locations therein, comprising:

an elongated linearly movable temperature probe for selected insertion into said material flow;

motor means operatively connected with said temperature probe for imparting linear movement thereto;



position sensing means operatively connected to said temperature probe for determining the relative position of said probe during said linear movement thereof; and

remote control means electrically connected to said temperature probe for selectively actuating said probe and providing a temperature profile comprising temperature and corresponding position data provided by said probe movement.

4,875,783

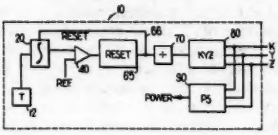
TEMPERATURE TRANSDUCER FOR KYZ PULSE RECORDER

Scott C. Swanson, Roswell, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Filed Apr. 22, 1987, Ser. No. 41,274

Int. Cl.[4] G01K *7/00*

U.S. Cl. 374—170 **10 Claims**



7. A temperature transducer for a data recorder, said data recorder including KYZ pulse input means, comprising:

a temperature sensitive element responsive to temperature for providing a temperature signal output corresponding to temperature;

integrating means for integrating said temperature signal over a predetermined time period and for providing an integrated output;

comparator means responsive to said integrated output for providing integrator reset pulses at a frequency related to temperature at said temperature sensitive element, said integrating means being responsive to each of said reset pulses for resetting for a subsequent integration;

pulse divider means responsive to said reset pulses for dividing the frequency of said reset pulses to a frequency corresponding to the input requirements of said data recorder;

KYZ output means for providing said frequency divided reset pulses a KYZ pulses to the KYZ input of said data recorder; and

power supply means connected to said KYZ input of said data recorder for providing power to said temperature sensitive element, said integrating means, said comparator means, said pulse divider means, and said KYZ output means.

4,875,784

DIVIDED SLIDE BEARING

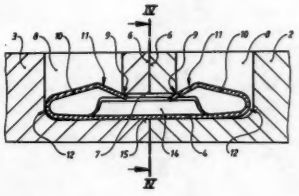
Karl Just, Friedrichshafen, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Friedrichshafen GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 302,304

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802275

Int. Cl.[4] F16C *17/02*

U.S. Cl. 384—273 **2 Claims**



1. A split slide bearing, comprising two bearing shell halves held together during the installation by clamp means made from a springy flat material, the bearing shell halves being provided with separating surfaces abutting at one another and with hollow spaces starting from the separating surfaces which extend-substantially perpendicularly to the separating surfaces, the clamp means which extend over the separating surfaces and are springily supported in the hollow spaces being arranged in said hollow spaces, the clamp means coming into form-locking abutment with edges within clamp areas adapted to be overcome by pressure in two directions, the edges resulting from the intersection of holes extending substantially transversely to the direction of the hollow pieces, the hollow spaces as also the holes extending transversely thereto being constructed as groove-shaped filled-out parts and the clamp means made from a unitary material part including each two bow-shaped legs bent to a side toward one another, said legs having inwardly inclined sections in the end areas, the clamp means being supported on their bottom side in the hollow spaces, and with the bearing shell halves placed one against the other abutting springily supported in both end areas at the straight edges of the intersection area which are disposed facing the same, and the clamp means with a unilateral seating in one bearing shell half abutting axially pressed against the hollow space wall within the area of the bend of the legs.

4,875,785

THRUST BEARING WITH A MAGNETIC FIELD DETECTOR

Alfred J. Santos, Canton; Frederick A. Cook, Jr., West Hartford; Scott M. Duncan, Avon, and John Moseley, Norfolk, all of Conn., assignors to The Torrington Company, Torrington, Conn.

Continuation of Ser. No. 120,406, Nov. 13, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 325,035

Int. Cl.[4] F16C *19/30*

U.S. Cl. 384—448 **7 Claims**

1. A thrust bearing comprising: a first thrust plate; a second thrust plate relatively rotatable with respect to the first thrust plate; means on the first thrust plate for permanently providing

a magnetic field; an annular detector support; and at least one detector on the annular detector support for detecting the magnetic field.

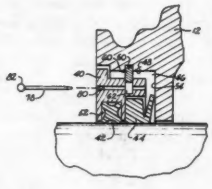
7. In combination: first and second annular thrust plates relatively rotatable with respect to one another with axially aligned spaced roller raceways; rollers in the space between the raceways; a plurality of permanently magnetized magnetic pole segments about the entire circumference of a radial portion of the first thrust plate, each segment having a North pole and a South pole, with the segments being arranged so that each pole is between two poles of opposite polarity; an annular member having a radial surface facing the permanently magnetized magnetic pole segments on the first thrust plate; and at least one magnetic field detector mounted on said radial surface of the annular member facing said permanently magnetized magnetic pole segments.

4,875,786

SNAP-RING WITH PIN RELEASE SEAL

Gary DeWachter, Greenville, S.C., assignor to Reliance Electric Company, Greenville, S.C.

Filed Dec. 29, 1988, Ser. No. 291,634
Int. Cl.[4] F16C *33/78*
U.S. Cl. 384—482 **7 Claims**



1. In a sealing system for a bearing having a housing with an interior chamber therein for receiving a shaft to be sealed, a bearing assembly arranged within the chamber and having bearing elements extending radially relative to the shaft and supporting the same for rotation, the housing being formed with an opening having a cylindrical surface formed with an annular groove concentric with the axis of the shaft to be supported therein, the improvement comprising:

an annular sealing device arranged within the opening concentric with the cylindrical surface,

an annular carrier member encircling the shaft adapted to be positioned within the opening for holding said sealing device in sealing position between the shaft and the bearing housing,

said carrier member having a flexible snap-ring adapted to be flexed inwardly during positioning of said carrier member within the opening and to extend into the annular groove in the cylindrical surface when in its unflexed condition, and

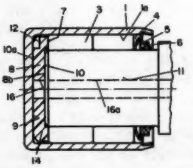
means mounted in said carrier member and engageable with snap-ring for holding the same in flexed condition during said positioning of said carrier member within the opening and to release said snap-ring after said carrier is within the opening to permit said snap-ring to assume its unflexed condition.

4,875,787

BEARING BUSHING FOR UNIVERSAL JOINT PINS

Bernhard Bauer, Wulflingerstrasse 13, 8728 Hassfurt, and Herbert Dobhan, Schleifweg 22, 8722 Bergrheinfeld, both of Fed. Rep. of Germany

Filed Jun. 28, 1988, Ser. No. 212,865
Claims priority, application Fed. Rep. of Germany, Jul. 3, 1987, 8709201[U]
Int. Cl.[4] F16C *19/22, 21/00, 33/58*
U.S. Cl. 384—548 **5 Claims**



1. A bearing bushing for universal joint pins comprising:

a thrust washer made of plastic disposed on a bottom surface of the bearing bushing having a contact surface for a plurality of cylindrical rollers and for a universal joint pin,

a plurality of circumferentially spaced first recesses on a side surface of the thrust washer facing away from the cylindrical rollers,

said first recesses having an axial depth equal to about half the thrust washer axial thickness, and

said first recesses being distributed around the periphery of the thrust washer adjacent the outer peripheral edge thereof and extending radially inwardly from the outer peripheral surface of the thrust washer approximately the length of the contact surface of the thrust washer and cylindrical roller, two adjacent first recesses forming a centrally located, radially directed projection around the periphery of the thrust washer and a series of radially directed shallow second recesses in the opposite side surface of the thrust washer defining lubricant pockets.

4,875,788

POSTAGE METER PRINTWHEEL SETTING APPARATUS

Donatas V. Gasiunas, Carmel, N.Y.; Paul R. Sette, Hamden, and Anthony Storace, Norwalk, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

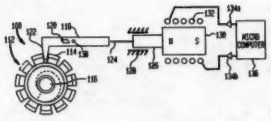
Filed Dec. 21, 1987, Ser. No. 136,084
Int. Cl.[4] B41J *1/52, 7/32*
U.S. Cl. 400—163.1 **4 Claims**

1. A printwheel selection apparatus comprising:

a picker link, said picker link having a picker cam mounted thereon and having a tooth operative for engaging slots on a rotatable printwheel;

a voice coil motor, said voice coil motor comprising a coil and a magnet arranged within the coil, said magnet being guided for linear reciprocating motion within the coil;

a flexible link connecting said picker link to the voice coil magnet and a cam stud fixed in relation to said rotatable printwheel and said voice coil motor, said picker cam being cammed about said cam stud by the reciprocating motion of the magnet for causing the tooth of said picker



link to engage one of said slots and to rotate said printwheel as said voice coil magnet moves in one direction and to disengage and to return to a position for again advancing the printwheel when the magnet moves in the opposite direction.

4,875,789

INK RIBBON CASSETTE WITH SLIDABLE RIBBON GUIDE

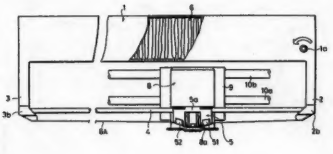
Hiroyuki Sato, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Dec. 21, 1987, Ser. No. 135,842

Claims priority, application Japan, Dec. 19, 1986, 61-195517[U]

Int. Cl.[4] B41J *32/02*

U.S. Cl. 400—196.1 **20 Claims**



1. An ink ribbon cassette for use with a printer having a reciprocable printing head which reciprocates along an axis during use of the printer, the ink ribbon cassette comprising: a cassette case having a pair of arms extending outwardly therefrom in opposed spaced-apart relationship, the arms having openings therein; an ink ribbon disposed to undergo lengthwise movement within the cassette case with a portion thereof slidably extending through the openings and bridging the space between the arms to define an exposed ribbon portion; a guide shaft supported by the cassette case and extending substantially parallel to the axis of reciprocation of the printing head; a ribbon guide slideable along the guide shaft and slidably engaging with the exposed ribbon portion, the ribbon guide having means directly slidably engageable with the printing head to enable the ribbon guide to undergo vertical displacement relative to the printing head and to follow the reciprocal movement of the printing head; and restricting means carried by the ribbon guide for restricting vertical displacement of the exposed ribbon portion relative to the cassette case while allowing lengthwise sliding movement of the exposed ribbon portion relative to the ribbon guide to thereby prevent slackening of the exposed ribbon portion.

4,875,790

PRINTING DEVICE HAVING GEAR CONNECTED MULTIPLE FEED PATHS

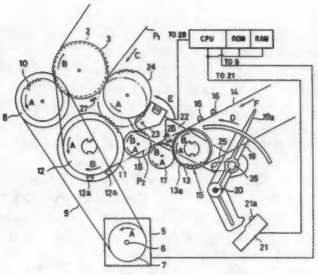
Yoshiyuki Karube; Toshimasa Hayakawa, and Yasunari Yoshida, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Tama, Japan

Filed Nov. 10, 1987, Ser. No. 119,054

Claims priority, application Japan, Nov. 10, 1986, 61-267079

Int. Cl.[4] B41J *11/48*

U.S. Cl. 400—605 **8 Claims**



1. A printing device having gear connected multiple feed paths wherein a cut-form printing sheet and a serial form printing sheet may be selectively brought into use which comprises

a platen for supporting the selected on of said cut-form printing sheet and said serial form printing sheet in its printing position;

first gear means coupled to and rotated with said platen;

tractor means for feeding said serial form printing sheet to its printing position;

second gear means coupled to said tractor means;

idler gear means displaceable in a direction perpendicular to an axial direction of said second gear means between a first position where said idler gear means engages said first gear means and disengages from said second gear means, and a second position, where said idler gear means engages both said first and second gear means;

displacing means for displacing said idler gear means between its first and second positions;

driving means for rotating said platen;

first sensing means for detecting the position of said idler gear means;

second sensing means for detecting the presence of said serial form printing sheet to be fed by said tractor means;

mal-operation detecting means for detecting the inadvertent displacement of said idler gear means by monitoring the results of said first sensing means and second sensing means to determine if said idler gear means has been shifted from said second position to said first position and then back to said second position while said second sensing means detects the presence of a serial form printing sheet; and

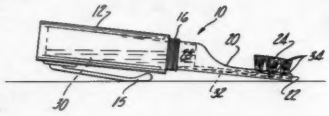
control means for controlling said driving means to rotate said platen by a predetermined amount sufficient to offset any rotation of the platen caused by the engagement or disengagement of the idler gear means and the second gear means so as to reposition said idler gear means by said predetermined amount upon detection of the inadvertent displacement of said idler gear means.

4,875,791

LIQUID DISPENSING BRUSH

Shawky A. Hassan, 1146 S. Linden Rd., Flint, Mich. 48504

Filed Feb. 3, 1984, Ser. No. 576,919
Int. Cl.[4] A46B *11/04, 17/04*
U.S. Cl. 401—176 16 Claims



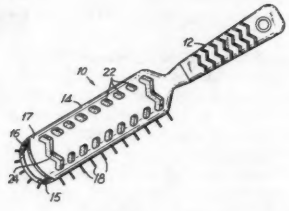
1. A liquid dispensing brush comprising:
an elongated arm having a longitudinal passage formed therein, said arm having first and second ends;
a plurality of bristles secured adjacent to said first end of said arm;
a fluid outlet formed in said arm adjacent said bristles, in fluid communication with said passage;
a fluid reservoir attached to said second end of said arm, in fluid communication with said passage, said reservoir having a predetemined volume; and
means for positioning said brush such that said outlet is below said reservoir;
wherein said brush further comprises a fluid disposed in said reservoir, wherein said fluid flows only by gravity from said reservoir to said outlet.

4,875,792

BRUSH DEVICE CONTAINING CARRIER MEDIA

Larry J. Canada, Granite City, Ill., assignor to Sekine Corporation, New York, N.Y.

Filed Aug. 17, 1987, Ser. No. 85,759
Int. Cl.[4] A45D *20/52;* A46B *11/04*
U.S. Cl. 401—283 10 Claims



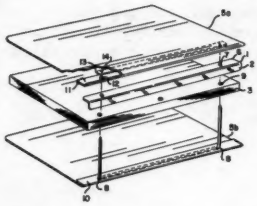
1. A brush for grooming hair and dispensing a treatment substance contained in a carrier material provided therein, the brush comprising:
a handle portion and a body portion integrally attached to the handle portion, said body portion having an elongated cavity formed therein which is permanently closed at a rear end of said cavity adjacent the handle portion, said cavity being coextensive with the body portion and adapted for receiving an absorbent structure, said body portion having an upper and a lower side and a plurality of spaced transverse openings extending through the upper and lower sides of the body portion between the cavity and the surrounding ambient air;
a plurality of bristles attached at spaced locations to the body portion lower side between said transverse openings, said bristles being provided in spaced transverse rows having a zig-zag alignment pattern substantially conforming to the body portion shape between said openings to facilitate lateral movement of hair strands while being groomed; and
an elongated absorbent structure removably provided within said elongated cavity in at least the body portion, said absorbent structure containing a treatment substance vaporizable at 70°–180° F. temperature, whereby the treatment substance contained in the elongated absorbent structure can evaporate and effectively contact the hair while strands of hair are moved laterally back and forth by the bristles during use of the brush for grooming the hair.

4,875,793

NOTEBOOK BINDER/LABEL HOLDER

William C. Deem, 15 Highview, P.O. Box 397, Jacksonville, Ill. 62651

Filed Jun. 1, 1987, Ser. No. 56,243
Int. Cl.[4] B42F *3/00, 13/40;* B42D *3/18*
U.S. Cl. 402—3 3 Claims



1. A label holder or rigid support device for paperboard binders having two covers and paper sheets retained by metal binding strips and fastening means said label device being formed of rigid sheet material and having a flat label portion to bear against substantially the entire length of the rear edges of said paper sheets, said label device also having an integral substantially flat securing flange extending rearwardly from the label portion in a plane disposed at an angle of ninety degrees from the plane of the label portion and engaging on the top sheets of the binder with the label portion pointed toward the back of the binder or on the bottom sheets of the binder with the flat securing flange pointed toward the front of the binder, said flange defining openings through which said metal binding strips pass for securing said label device to the sheets and said fastening means.

4,875,794

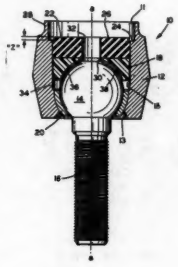
PRELOADED STEERING BALL JOINT ASSEMBLY AND METHOD

Karle O. Kern, Jr., Reminderville, Ohio, assignor to Dana Corporation, Toledo, Ohio

Filed Dec. 23, 1987, Ser. No. 137,393
Int. Cl.[4] F16C *11/06*
U.S. Cl. 403—132 9 Claims

1. In a preloaded ball joint assembly adapted for use in a vehicular sterring link, said joint assembly including a ball and a shaft integrally fixed to said ball, a ball housing defining a longitudinal axis, said housing having first and second openings aligned with said axis, said first opening containing a circumferential housing lip, said first opening also containing an internal circumferentially extending shoulder adjacent said lip circumferential housing said second opening defining a passageway for said shaft, said housing defining an internal ball socket cavity containing first and second opposed bearing seats defining a lubrication chamber therebetween and about said ball, each bearing seat comprising a semi-spherical member formed of a low surface friction material, said second bearing seat containing an opening for passage of said shaft, said second bearing seat being positioned against said second opening of said housing to accommodate said shaft, said ball socket cavity containing a metal disc and a compressed elastomer disc

juxtaposed against said metal disc, said elastomer disc being urged against the first bearing seat by said metal disc, said metal disc retained tightly against said compressed elastomer disc by said circumferential housing lip; an improvement comprising in combination (1) said elastomer disc being formed in-situ by insert molding, wherein molten elastomer is forced into said socket cavity, and (2) said first bearing seat being formed with a circumferential barrier lip which is dimensioned



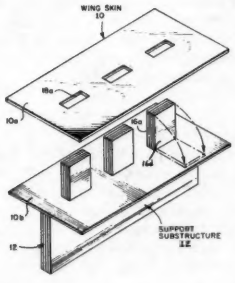
for an interference fit with said ball socket cavity, said circumferential barrier lip comprising an angled side wall extending in a direction toward said elastomer disc, said circumferential barrier lip adapted for expanding radially outwardly against said socket cavity under pressure of said molten elastomer, whereby during insert molding of said elastomer disc, said circumferential barrier lip is effective to prevent entry of molten elastomer into said lubrication chamber.

4,875,795

STRUCTURAL CONNECTOR UTILIZING TABBED SUPPORT SUBSTRUCTURE

Robert E. Anderson, Huntington Station, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 11, 1987, Ser. No. 131,700
Int. Cl.[4] F16B *1/00*
U.S. Cl. 403—279 **10 Claims**



1. A joint connecting first and second structural members comprising:

a first structural member having multiple plies each having at least a tab extending from a shoulder portion, the tab being juxtaposed on corresponding tabs of other plies;

a second structural member having multiple plies and an opening formed therein for receiving the tabs and enabling the second structural member to abut the shoulder portion of the first structural member;

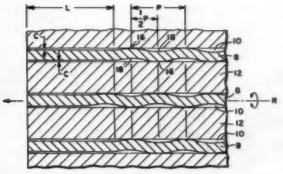
wherein pairs of tabs are folded against respective plies of the second structural member to interleave the first and second structural members into connecting relationship.

4,875,796

PRESS-FIT SPLINED CONNECTION

Eric L. Storm, Bowling Green, Ky., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 23, 1987, Ser. No. 124,199
Int. Cl.[4] B25G *3/28*
U.S. Cl. 403—359 **15 Claims**



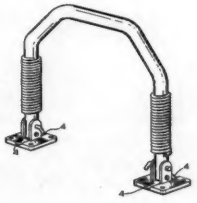
1. A press-fit splined connection between a first rotary member having at least one elongate groove and a second rotary member having at least one elongate tooth operative to register with and be slidingly received within the groove to provide the splined connection between the first and second members, said press-fit provided by the groove having opposite side walls that are substantially straight and at least a portion of the opposite side walls of the tooth having respective sinusoidal wave configurations of at least one period along its length providing at least two convex surfaces that respectively impinge upon the opposite side walls of the groove with sufficient interference to provide the press-fit between the first or second members.

4,875,797

PARKING SPACE GUARD

Klaus Hartwig, Toronto, Canada, assignor to Kaymar-Parkguard Inc., Toronto, Canada

Filed Jun. 14, 1988, Ser. No. 207,116
Int. Cl.[4] E01F *9/00*
U.S. Cl. 404—9 **2 Claims**



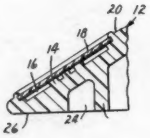
1. A parking space guard comprising a base for anchoring said guard to a supporting surface and a blocker movable from a down access to an up blocking position, said base comprising a mounting plate with a pair of upstanding arms between which said blocker is pivotally and lockably secured, said arms being forwardly open for raising and lowering said blocker, said base further including a forwardly extending channel in which said blocker lies when in the down position for lowering the outer end of said blocker to ground level, said mounting plate being recessed immediately beneath said blocker for clearance of the lower end of said blocker past said mounting plate while lowering to the down position.

4,875,798

RETROREFLECTIVE PAVEMENT MARKER

David C. May, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 30, 1988, Ser. No. 213,781
Int. Cl.[4] E01F 9/06
U.S. Cl. 404—12 11 Claims



1. Raised pavement marker comprising a substantially rigid body having a bottom surface, at least one sloped face, septa projecting from said sloped face, and a plastic cube-corner reflector, having at least 500 cube-corner elements per cm^2 formed by intersecting sets of parallel grooves, bonded to the septa to provide a plurality of cells beneath the reflector, the depth of which is sufficient that cube corners of the reflector between the septa do not contact the body when the pavement marker is adhered to a roadway and subjected to vehicular impact, said pavement marker being characterized by:

the exposed face of the reflector forming an angle of from 15° to 45° to the surface of the roadway and

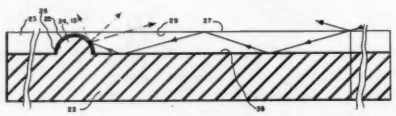
the overall thickness of the cube corner reflector being less than 2 mm.

4,875,799

TRAFFIC LANE MARKING DEVICE

George M. Harrison, 320 Salem Dr. (Apt. H), Vermillion, Ohio 44089

Filed Sep. 6, 1988, Ser. No. 240,623
Int. Cl.[4] E01F 9/06
U.S. Cl. 404—12 13 Claims



1. A night-visible traffic marking device for installation embedded into aircraft landing strips, vehicle roadways and the like, comprising:

a generally planar plate member of transparent material installed with its upper surface flush with the traffic contacting surface;

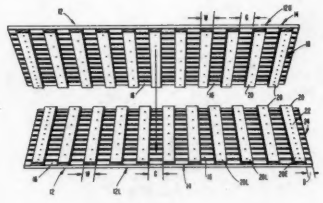
at least one night-visible object upstanding within the plate member to provide a substantial vertical profile from the point of view from an oncoming vehicle, the side of said object facing the vehicle being curved and including material selected to be highly visible when impinged upon by light from said vehicle.

4,875,800

TEMPORARY SUPPORT SURFACES FOR USE ON MUDDY OR MARSHY LAND AREAS

Gary D. Hicks, Sugarland, Tex., assignor to Way Construction, Inc., Stowell, Tex.

Filed Jan. 22, 1988, Ser. No. 147,300
Int. Cl.[4] E01C 5/14, 9/08
U.S. Cl. 404—35 19 Claims



1. A temporary support structure for use on muddy or marshy land areas, said support structure comprising:

a plurality of panels, each panel including a rigid first tier and a second tier disposed in superimposed relation to said first tier, said second tier comprising a row of rigid boards arranged in side-by-side relationship and fixedly connected to said first tier, at least some of said boards spaced apart to define locking gaps therebetween, said boards being connected to said first tier of solely its respective panel so that said panels define separately movable units,

a first plurality of said panels positioned to define a lower layer of panels in which said first tier thereof rests upon the ground and said row of boards thereof extends upwardly t define lower locking boards,

a second plurality of said panels positioned to define an upper layer of panels disposed upon said lower layer of panels, said panels of said upper layer arranged such that said first tiers thereof face upwardly to define a working surface, and said rows of boards thereof extend downwardly to define upper locking boards disposed parallel to said lower locking boards, said first tiers of successively arranged panels of said upper layer being disposed in substantially end-to-end relationship, said upper locking boards disposed loosely in said locking gaps defined between said lower locking boards, said lower locking boards disposed loosely in said locking gaps defined between said upper locking boards.

16. A method of forming a temporary support structure to define a working surface on muddy or marshy land areas, said method comprising the steps of:

providing a plurality of panels, each of which panels including a first tier and a second tier disposed in superimposed relation to said first tier, said second tier comprising a row of rigid boards arranged in side-by-side relationship and fixedly connected to said first tier, at least some of said boards spaced apart to define locking gaps therebetween,

arranging a first plurality of said panels as a lower layer of panels in which said first tier thereof rests upon the ground and said row of boards thereof faces upwardly to define lower locking boards, and

arranging a second plurality of said panels as an upper layer of upper panels disposed upon said lower layer of lower panels, such that:

said first tier of said upper panels faces upwardly to define a working surface, and said rows of boards thereof face downwardly to define upper locking boards disposed parallel to said lower locking boards, and said first tiers of successively arranged panels of said upper layer disposed in substantially end-to-end relationship,

said upper locking boards are disposed loosely in said locking gaps defined between said lower locking

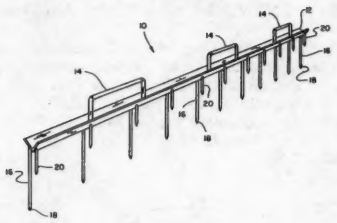
boards, said lower locking boards disposed loosely in said locking gaps defined between said upper boards.

4,875,801

EXPANSION JOINT BRACE AND ALIGNER

Anthony Montrym, 1333 Woodpath, Florissant, Mo. 63031

Filed May 11, 1988, Ser. No. 193,243
Int. Cl.[4] E01C *11/02*
U.S. Cl. 404—48 **3 Claims**



1. A concrete expansion joint aligner for supporting and aligning an expansion joint which may be removed after poured concrete adjacent to the expansion joint begins to harden while leaving the expansion joint in place comprising:

a unitary construction, said unitary construction being comprised of

an elongated base plate having a plurality of ground pegs and a plurality of aligning pegs permanently attached thereto and projecting from said elongated base plate in a substantially perpendicular relationship with respect to said base plate wherein a row of said aligning pegs is substantially parallel with a row of said ground pegs,

the space defined by and between said ground pegs and said aligning pegs being adapted to retain an expansion joint in place while fresh concrete is poured against at least one side of said expansion joint, and wherein said ground pegs extend further from said base plate than said aligning pegs.

3. A process for pouring fresh concrete in a continuous strip with periodic expansion joints in place in said continuous strip comprising putting in place opposite continuous sidewalls to condine said fresh concrete,

putting in place a unitary construction concrete expansion joint aligner between said parallel side walls in transverse relationship therewith by placing said concrete expansion joint in the interstices between a series of ground pegs and a series of aligning pegs both fixedly attached to an elongated base plate in perpendicular relationship thereto,

thereafter, placing said unitary construction expansion joint alignr confining said expansion joint by driving said ground pegs into the ground to a distance sufficient to align the top of said expansion joint with said side walls,

pouring fresh concrete against both sides of said expansion joint held in place by said expansion joint aligner,

after said concrete becomes partially cured, removing said unitary construction expansion joint alginer while leaving said expansion joint in place to define abutting sections of poured concrete.

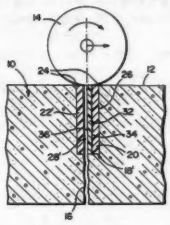
4,875,802

INSTALLATIONAL CONCRETE JOINT INSERT AND METHOD OF PREVENTING EDGE SPALLING

Samuel A. Face, III, Newport News, Va., assignor to The Edward W. Face Co., Inc., Norfolk, Va.

Filed Sep. 7, 1988, Ser. No. 241,420
Int. Cl.[4] E01C *11/08*
U.S. Cl. 404—67 **18 Claims**

1. A method of preventing spalling of a concrete surface at edges of bonding interfaces defining expansion spaces occupied by fillers having a tensile strength resisting formation therein of stress-induced cracks, the steps of: placing inserts into said expansion spaces extending from the concrete surface; spacing opposite sides of the inserts throughout from the bonding interfaces; and bonding the fillers during installation within



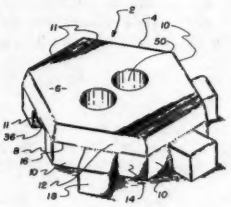
the spaces at said bonding interfaces with greater adhesions than at said sides of each of the inserts; whereby the stress-induced cracks are directed during formation along said sides of the inserts in spaced relation to said edges at the concrete surface.

4,875,803

BLOCK-FORMED REVETMENT SYSTEM FOR CONTROLLING SOIL EROSION

Michael J. Scales, 4905 Windwood Dr., Doraville, Ga. 30360

Filed Jul. 18, 1988, Ser. No. 220,078
Int. Cl.[4] E02B *3/12*
U.S. Cl. 405—16 **36 Claims**



35. A revetment block for being coupled with other similar blocks to form a flexible revetment mat for controlling erosion of soil, comprising:

a grid having a top surface, a bottom surface, and six side surfaces, each said side surface comprising an upper side surface and a lower side surface which form a common continuous edge between the top surface and the bottom surface of said grid, wherein said upper side surface slopes inwardly from the common edge to the top surface of said grid, and said lower side surface is more vertical than said upper side surface and wherein a tongue extends from each of three adjacent said side surfaces, each tongue having a height and width less than the total height and width of said grid, and wherein each of said side surfaces which has no tongue has a receiving cavity having a top wall and sidewalls, said cavity being of a size sufficient to receive and allow limited vertical and horizontal movement of tongues from other blocks within said cavity.

4,875,804

QUADRANGULAR STEPPED MOSAIC BREAKWATER

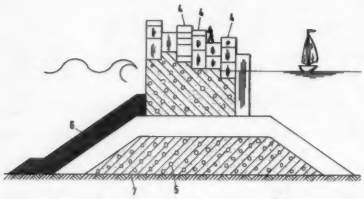
Pedro S. Bores, Vegafria 1, T 1, Madrid, Spain E 28035

Continuation-in-part of Ser. No. 923,678, Oct. 26, 1986, Pat. No. 4,801,220, which is a continuation-in-part of Ser. No. 861,139, May 8, 1986, which is a continuation-in-part of Ser. No. 786,840, Oct. 11, 1985, abandoned. This application Dec. 24, 1986, Ser. No. 946,446

Claims priority, application Spain, Dec. 28, 1985, 291366

Int. Cl.[4] E02B 3/06

U.S. Cl. 405—31 1 Claim



1. A breakwater comprising

(A) a base having a vertically-fixed upper surface; and

(B) an interlocking plurality of vertically-oriented, water-impermeable elements of substantially identical, generally quadrangular cross-section, said elemelnts being mounted on said base, disposed in a monolithic horizontally-extending fascine and defining a vertically stepped mossaic crown; each of said elements commencing at said base and terminating in said crown, including at least one substantially planar vertically-extending side defining a key and at least one other substantially planar vertically-extending side defining a complementary key-receiving keyway, and sharing with another of said elements at least one contiguous interlocked side, said at least one and at least one other substantially planar vertically-extending sides being essentially planar and vertical except for said key and keyway, respectively, said key and keyway extending no more than one third of their respective sides, said interloccking plurality of elements defining a barrier through which water cannot flow.

4,875,805

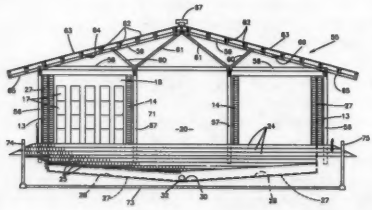
TOXIC WASTE STORAGE FACILITY

Robert Gross, 175 Drennen Rd., Orlando, Fla. 32806

Filed Sep. 6, 1988, Ser. No. 240,527

Int. Cl.[4] B09B 3/00

U.S. Cl. 405—128 9 Claims



1. A toxic waste storage facility comprising:

a plurality of contiguous above-ground storage cells, each of the storage cells defined by substantially vertical walls constructed from separate compacted earth blocks, the walls enclosing each of the storage cells and isolating each storage cell from each adjacent storage cell, each of the storage cells having a floor of compacted layers of clay with an impervious plastic liner beneath the layers of clay;

a plurality of liquid storage containers stacked in each of the storage cells, each of the containers containing toxic waste; and

clay filler located within the walls of the storage cells and filling the space around the containers.

4,875,806

NODE INTERSECTION BETWEEN COLUMNS AND PONTOON MEMBERS AT A TENDON-MOORED PLATFORM

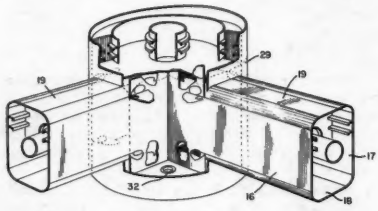
Kaj Lindberg, Mölndal; Gerry Steen, Gothenburg, and Elon Germundson, Torslanda, all of Sweden, assignors to Gotaverken Arendal AB, Gothenburg, Sweden

Filed Mar. 15, 1988, Ser. No. 168,356

Claims priority, application Sweden, Mar. 20, 1987, 8701162

Int. Cl.[4] E02D 5/54

U.S. Cl. 405—224 6 Claims



1. A tendon-moored semisubmersible offshore platform comprising:

columns;

pontoon members interconnected into a foursided frame via said columns, said pontoon members being defined by vertical side walls, a horizontal deck, and a horizontal bottom skin; and

at least one node intersection which includes vertical bulkheads that intersect continuations of said vertical sidewalls within lower ends of said columns.

4,875,807

METHOD AND MEANS FOR BASEMENT CONSTRUCTION

Jen-Jui Liu, No. 253, Chneh-Min Rd., San-Min District, Kaohsiung, Taiwan

Filed May 17, 1988, Ser. No. 195,686

Int. Cl.[4] E02D 5/00

U.S. Cl. 405—229 9 Claims

1. A method and means for basement construction comprising the steps of:

(a) excavating a continuous side wall trench according to the construction requirement at a situs of a basement;

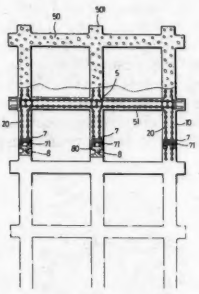
(b) preparing a plurality of reinforcement structures, each having a plurality of projecting steel rods horizontally provided in rows at an upper portion and a lower portion on one side thereof;

(c) preparing a plurality of baffle plates each having a plurality of orifices formed in rows therein for being detachably fixed to each one of the reinforcement structures at the lower portion thereof with the projecting steel rods of each reinforcement structure extending out of the orifices of each baffle plate;

(d) detachably installing a plurality of pushing jacks on a back side of each baffle plate, and placing the reinforcement structures, together with the baffle plates and the pushing jacks, in the continuous side wall trench and starting the pushing jacks so as to drive the baffle plate forward to be abutted on the ground with the projecting

rods being respectively inserted into the earth of the continuous side wall trench, and then taking out the pushing jacks therefrom;

(e) vertically disposing a plurality of trough devices each having a buffer which lines an inner wall thereof, against a running side of each reinforcement structure with an open section of each trough device facing outward thereat; and



(f) vertically positioning an H-member against each open section of the trough devices to closely seal up the continuous side wall trench thereat; so that, by grouting over the reinforcement structures in the closed continuous side wall trench, a strong and shockproof basement side wall will be effectively accomplished.

4,875,808

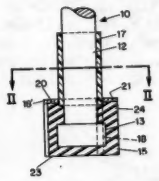
SEISMIC ANCHOR

Roger C. Kellison, 8200 Blvd. East, North Bergen, N.J. 07047

Filed Apr. 14, 1988, Ser. No. 181,655

Int. Cl.[4] E02D *5/74*

U.S. Cl. 405—244 **13 Claims**



1. A vibration damping anchor system including:

an elongate shaft,

an enlarged head on said shaft,

vibration damping means surrounding the head and preventing the head from resting against the bottom or sides of an opening receiving the anchor system, and

means for covering a length of said elongate shaft and extending away from the vibration damping means to permit movement of the shaft therein.

4,875,809

METHOD FOR STABILIZING CLAY MINERALS DURING OIL EXPLOITATION BY STEAM INJECTION

Géza Csajtai, 3 Bozso K. u, Szolnok; Sándor Doleschall, 21/B Varoskuti ut, Budapest; Gyula Milley, 53 Somogyi B. u., Nagykanizsa; Miklós Kristóf, 4 Klauber J. u., Szolnok; Tibor Pál, 16 Beke ut, Nagykanizsa; Dániel Rácz, 47/B Filler u., Budapest II, and Béla Tóth, 4 Lowy S. u., Szentendre, all of Hungary

Continuation-in-part of Ser. No. 900,782, Aug. 27, 1986, abandoned. This application Apr. 28, 1988, Ser. No. 187,376

Claims priority, application Hungary, Aug. 24, 1985, 3262/85

Int. Cl.[4] E02D *3/12*

U.S. Cl. 405—263 **10 Claims**

1. A process for stabilizing a reservoir rock having a layer structure of 2:1 containing clays, said process comprising introducing into said rocks a solution of cations having a coordination number 12 and having a hydrated ion diameter of 0.13 to 0.1 nm.

4,875,810

APPARATUS FOR CONTROLLING FINE PARTICLE FLOW

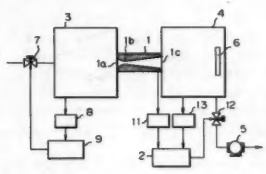
Yuji Chiba, Atsugi; Kenji Ando, Kawasaki; Masao Sugata, Yokohama; Hiroyuki Sugata, Atsugi; Toshiaki Kimura, Sagamihara, and Kuniji Osabe, Tama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 920,437, Oct. 29, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 325,021

Claims priority, application Japan, Oct. 21, 1985, 60-233561; Oct. 21, 1985, 60-233562

Int. Cl.[4] C23C *13/08*

U.S. Cl. 406—14 **12 Claims**



1. An apparatus for blowing fine particles, on a substrate, comprising:

a convergent-divergent nozzle having an outlet through which fine particles are blown on the substrate;

means for sensing pressure at the outlet of said nozzle and pressure downstream from said nozzle; and

a controller for controlling feeding of a gas to said nozzle and/or discharge of the gas downstream from said nozzle based on a comparison of the pressure at the outlet of said nozzle and the pressure downstream from said nozzle in such a manner that a stable beam of the fine particle flows from said nozzle.

4,875,811

APPARATUS AND METHOD FOR TRANSPORTING AND UNLOADING CONTAINERS

Ronald G. Merrett, and Oscar Eakin, Jr., both of Houston, Tex., assignors to Intermodal Container Systems, Harris County, Tex.

Continuation of Ser. No. 10,010, Feb. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 871,692, Jun. 6, 1986, abandoned. This application Jan. 25, 1989, Ser. No. 301,985

Int. Cl.[4] B65G *53/46*; B60P *1/16*

U.S. Cl. 406—39 **48 Claims**

19. A highway trailer for the gravity unloading of particulate lading from a detachable intermodal container of around

twenty (20) feet in length removably supported on the highway trailer, the lading being adapted for gravity discharge through a bottom discharge opening adjacent a rear end door of the container, said highway trailer having:

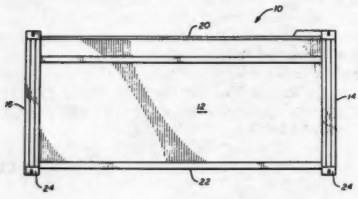
an elongate body having a pair of horizontally spaced rear axles thereon with associated rear wheels and a pair of longitudinally extending support members supported on said rear wheels;

an elongate container support frame mounted over said support members and adapted to releasably support a removable container thereon;

means mounting the rear end of said container support frame for pivotal movement relative to said elongate body along a horizontal axis spaced horizontally rearward of the rear end of said container;

power means connected between said body and the front end of said container support frame for raising said front end about said pivotal mounting means for tilting said container support frame and container thereon relative to said body for gravity unloading of the container;

a rotary valve on said elongate body at a position spaced rearwardly of and below the pivotal mounting of said container support frame and the rear end of the container;



means mounting the rotary valve between the longitudinally extending support members at a horizontal location between the rear wheels of the body and the pivotal mounting of the container support frame;

a throttle valve adapted for mounting on the container support frame adjacent the bottom discharge opening in said container;

means on the container support frame for positioning the throttle valve with the discharge opening;

means to manually adjust the opening of said throttle valve to control the gravity flow of lading from the container upon tilting of the container support frame beyond the angle of repose of the lading;

a flexible lading conduit detachably connected between the throttle valve and the rotary valve extending from the rotary valve at an angle with respect to the horizontal when said container support frame is tilted beyond the angle of repose of the lading sufficient to provide a desired gravity flow of the lading to the rotary valve for a relatively fast gravity unloading of the lading from the container; and

a pneumatic hopper beneath the rotary valve to receive the lading from the rotary valve for pneumatic unloading.

4,875,812

CUTTING TOOL EMPLOYING A DOUBLE PIN RETENTION ASSEMBLY

Sazzadul Haque, Troy; Thomas O. Floyd, Sterling Heights; Nick Savas, Dearborn, and Walter H. Kelm, Mt. Clemens, all of Mich., assignors to Carboloy Inc., Warren, Mich.

Continuation-in-part of Ser. No. 936,275, Dec. 1, 1988, abandoned. This application Apr. 11, 1988, Ser. No. 180,242

Int. Cl.[4] B23B *29/04, 29/12*

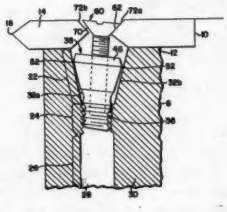
U.S. Cl. 407—104 **8 Claims**

1. A cutting tool comprising:

(a) a cutting insert having a first axial hole;

(b) a cutter body comprising a recess at one end including a base and at least one shoulder connected to the base for supporting the cutting insert, and a second axial hole alignable with the first axial hole and extending from the recess into at least a portion of the cutter body, wherein the second axial hole comprises an upper portion and a lower portion containing mean for reversibly locking therein a primary retention pin at an angle with respect to the axis of the lower portion, said upper portion comprising an inwardly tapered wall extending from the recess thereby forming a conical-shaped section having a longitudinal axis offset from the axis of the lower portion;

(c) a primary retention pin adapted to be reversibly locked in the second axial of the cutter body at said angle and comprising a third axial hole extending through at least a portion of the primary retention pin, means in said third axial hole for reversibly locking a secondary retention pin therein, and a body having a top end and a bottom end and



an inwardly tapered side surface, at least a portion of the side surface adapted to engage the inwardly tapered wall of the upper portion of the second axial hole, said primary retention pin being movable from a first position therein the longitudinal axis of the primary retention pin is substantially parallel to the axis of the lower portion of the second axial hole, to a second position wherein said longitudinal axis is angled with respect to the axis of the lower portion of the second axial hole in the direction of the shoulder of the recess; and

(d) A secondary retention pin adapted to be inserted through the first axial hole of the cutting insert and into the third axial hole in the primary retention pin and comprising means in conjunction with the third axial hole for reversibly locking the secondary retention pin therein and means for exerting pressure against the cutting insert in the direction of the recess and the shoulder of the recess.

4,875,813

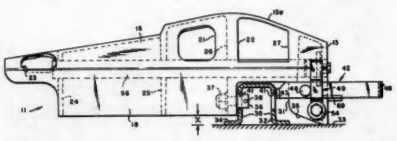
WHEEL CHOCK

Donald L. Moyer, 5753 N. 80th St., Omaha, Nebr. 68134, and Thomas O. Allred, 10311 Adams St., Omaha, Nebr. 68127

Filed Dec. 6, 1988, Ser. No. 280,350

Int. Cl.[4] B61D *3/18*; B60P *3/07*

U.S. Cl. 410—9 **23 Claims**



1. A wheel chock for use on a motor vehicle transporter for releasable attachment to an elongated restraining element affixed to the transporter and having a pair of upright walls, at least one of which contains a longitudinal series of uniformly spaced and sized holes, the chock comprising.

a. an elongated, monolithic body formed with a central ridge

wall flanked by a pair of downward sloping, wheel-engaging side wall portions arranged symmetrically with respect to the ridge wall, and with a transverse, open bottom recess adapted to receive the restraining element and bounded at one side by a transverse web; and

b. a pair of locking pins fixed to the body, projecting into the transverse recess from the transverse web, and being arranged to engage in alternate holes in the restraining element,

c. the recess containing an unobstructed space beyond the ends of the pins slightly wider than the restraining element, whereby the body may be placed on that element from above and then shifted in the direction of its length to bring the pins into engagement with said holes, and

d. the body being tiltable in both horizontal and vertical planes with respect to the restraining element when the pins are engaged in said openings, but the magnitude of such tilting being limited by the margins of the recess so that at least one of the pins always remains engaged in its associated hole.

4,875,814

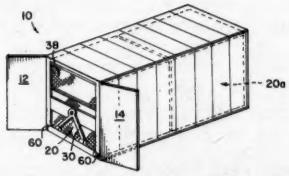
INTERMODAL CAGED FLATBED FOR EFFICIENT CONTAINERIZED CARGO HANDLING

Raymond N. Weller, 1421 Waylon Ave., Norfolk, Va. 23509

Filed Dec. 18, 1987, Ser. No. 134,984

Int. Cl.[4] B60P *1/00, 7/13*

U.S. Cl. 410—66 **13 Claims**



1. An intermodal caged flatbed for cargo handling in cooperative association with any conventional box-like freight shipping container comprising,

a floor for receiving and supporting cargo and having a front, rear, and opposite sides,

a perimetrical cage, said cage including apertured panels around said floor, and having door means extending the full length of a said side,

said floor and cage having overall external dimensions defining a size generally closely receivable in height and width within a said freight shipping container,

expandable pressure means mounted on at least two opposing longitudinally extending sides of said cage flatbed for securing said flatbed within a said container irrespective of slightly varying internal dimensions of any particular said container within which said flatbed is received,

and means for expanding each said pressure means between and into engagement with a respective external side of said caged flatbed and a respective adjacent internal wall of a said container to firmly position one with respect to the other.

4,875,815

BLIND FASTENER

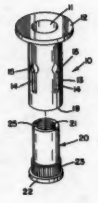
Ronald W. Phillips, II, Mogadore, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Mar. 17, 1988, Ser. No. 169,532

Int. Cl.[4] F16B *13/04, 13/06*

U.S. Cl. 411—38 **4 Claims**

1. A blind fastener having a head and tubular body which is integral with said head, said tubular body having a thin walled portion along its length to facilitate the outward protrusion as by an upsetting action to engage the blind surface to which such fastener is attached, the end portion of said tubular body remote from said head having an annular edge, a sleeve frictionally journaled in said tubular body, said sleeve having an internal upper threaded portion, said upper portion of said sleeve having an upper edge that is substantially below said head of said fastener, the outside diameter of said sleeve being slightly greater diameter than inside diameter of upper portion



of said tubular body to provide an interference fit between said upper portion of said tubular body and said upper portion of said sleeve upon upsetting of said tubular body as said sleeve moves into interference fitting with said upper portion of said tubular body, said sleeve having a closed lower end portion, said end portion having a flange abuttingly engaging said annular edge to facilitate the upsetting of said tubular body, and the lower end portion of said sleeve secured to the lower end portion of said tubular body.

4,875,816

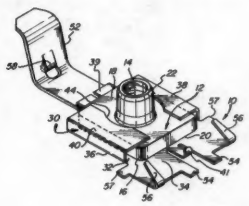
CAGED FASTENER

Francis C. Peterson, Woodbury, Conn., assignor to Buell Industries, Inc., Waterbury, Conn.

Filed Oct. 31, 1988, Ser. No. 264,612

Int. Cl.[4] F16B *27/00, 37/00*

U.S. Cl. 411—104 **9 Claims**



1. A caged fastener, comprising:

a fastener body having connecting means therein;

cage means for encaging said fastener body, said cage means providing a limited range of movement of said fastener body in at least one direction, and having apertures sized and adapted to allow access to said bore within the range of movement of said fastener body; and

holding members extending from said cage means, said holding members being sized and adapted to frictionally fit against surfaces for mounting said caged fastener, said holding members comprising at least one spring member which extends from at least one end of said cage means, and at least one lateral strut extending from said cage means generally perpendicularly to said spring member.

4,875,817

SEALED WELD NUT

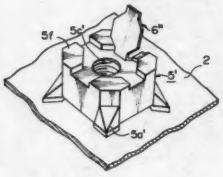
Hiroyuki Suzumura; Yuji Okamoto, both of Toyota, and Isao Suezaki, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 7, 1987, Ser. No. 70,822

Claims priority, application Japan, Jul. 11, 1986, 61-163047; Jul. 14, 1986, 61-165285; Jul. 14, 1986, 61-165286; Jul. 26, 1986, 61-176097

Int. Cl.[4] F16B 37/06, 37/14

U.S. Cl. 411—171 2 Claims



1. A sealed weld nut comprising:

a nut body having an axial through-bore along a center axis thereof, said nut body having first and second axial ends, and said through-bore having an inner wall surface;

a threaded portion provided on at least a part of said inner wall surface;

weld portions provided at the first axial end of said nut body;

a plurality of projections provided at the second axial end of said nut body and spaced around said through-bore; and

a separate plate-like sealing member provided at said second axial end of said nut body for preventing foreign material from passing into said through-bore at said second axial end, said plate-like member having a movable portion capable of covering and uncovering said through-bore so as to close and open said through-bore, a stationary portion, and a flexible portion connecting said movable and stationary portions, said stationary portion being fixed between projections at said second axial end.

4,875,818

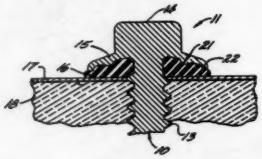
SCREW HAVING A SEALING WASHER

Ernest W. Reinwall, McHenry, Ill., assignor to Elco Industries, Inc., Rockford, Ill.

Continuation of Ser. No. 556,555, Nov. 30, 1983, abandoned. This application Aug. 27, 1985, Ser. No. 770,294

Int. Cl.[4] F16B 33/00

U.S. Cl. 411—369 2 Claims



1. A fastener adapted to be driven into a workpiece and comprising an elongated and externally threaded shank, a head of generally circular cross-section integral with one end of said shank and generally coaxial with the shank, the underside of said head being concave, an annular flange depending from the outer periphery of said head and disposed at an angle relative to the underside of the head, the underside of said head being substantially frustoconical across substantially the entire span extending from the inner periphery of said flange to the outer periphery of said shank, a washer made of resiliently compressible material encircling said shank and disposed beneath said head to be compressed between the head and the workpiece when the fastener is driven into the workpiece, the diameter of the uncompressed washer being less than the inside diameter of said flange, said washer having at least one generally planar end disposed in a radial plane prior to initial compression of the washer, the outer peripheral portion of said one end of said washer engaging an outer peripheral portion of the frustoconical underside of said head just prior to initial compression of said washer with such engagement causing the remaining portion of said one end of said washer to be spaced axially from the frustoconical underside of said head whereby a space is defined between the washer and the underside of said head, and a single annular rib projecting downwardly from the underside of said head and into said space to divide said space into a single inner cavity and a single outer cavity, said rib being coaxial with and spaced radially outwardly from said shank so as to engage said one end of said washer between the inner and outer peripheral portions thereof, said rib having inner and outer sides respectively facing inwardly toward and outwardly from said shank and each inclined at an acute angle relative to a plane disposed transversely of said shank whereby driving of the fastener into the workpiece causes said rib to exert a force effecting a sealing circle between the washer and the workpiece and at the same time causes said inner side of said rib to urge the compressible material at the inner peripheral portion of said washer inwardly into engagement with said shank with some of such compressible material flowing into and substantially filling said inner cavity, driving of said fastener also causing the outer side of said rib to urge the compressible material at the outer peripheral portion of said washer outwardly into engagement with said flange with some of such compressible material flowing into and substantially filling said outer cavity.

4,875,819

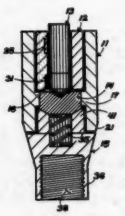
WHEEL LOCK SYSTEM APPARATUS

Kevin Wilkinson, 2050 S. Ridgewood Ave. #C-24, S. Daytona Beach, Fla. 32019

Filed Oct. 11, 1988, Ser. No. 255,955

Int. Cl.[4] F16B 37/08, 41/00

U.S. Cl. 411—432 2 Claims



1. A wheel lock apparatus for selective threaded securement to a threaded boss comprising in combination,

an outer hexagonal main body means for selective interlocking securement to a wheel mount member wherein said wheel mount member is formed with a threaded bore axially aligned with said main body means for securement to said threaded boss, and

reciprocating latch means axially aligned within said wheel mount means in a retracted first position to disengage said main body means from said wheel mount member and wherein said reciprocating latch means is resiliently biased to a second extended position to interlock said hexagonal main body means to said wheel mount member, and

an elongate main body formed with vertical exterior surface flats for enabling securement thereabout by a torquing instrument, and

an elongate positioning cylinder mounted within said main body wherein said positioning cylinder includes a recess

formed at a lowermost portion thereof receiving a transverse bolt;

said transverse bolt integrally formed to an elongate lock bolt means reciprocatably mounted within said positioning cylinder for securement of said lock bolt means in said positioning cylinder, and

a wheel mount member fixedly and spacedly secured relative to said positioning cylinder for securement to said threaded boss, and

a latch member positionable in an extended position wherein said lock bolt is in said first position to interlock said main body to said wheel mount, and

said latch member positionable in a retracted position when said transverse bolt is oriented below said recess to disengage said wheel mount relative to said main body when said lock bolt is in said second position, and

wherein said main body is formed with a plurality of annular ribs extending within an interior bore and projecting beyond an interior surface defined by said interior bore wherein said ribs are provided with a plurality of diametrically opposed gaps to accept said latch member in said extended position and accept said transverse bolt in said first position, and

wherein said transverse bolt is positioned to overlie the extensible and retractable latch member and said recess of said positioning cylinder is aligned with and underlying a lock bolt recess for selectively receiving a latch mounted within said lock bolt, and

wherein said lock bolt is formed with a forward conical nose positionable within a conical recess formed in said latch member, and

wherein said latch member is formed with a central cylindrical body and a plurality of diametrically opposed wings extending from said cylindrical body positionable between said ribs, and

wherein said wheel mount is formed with a plurality of annular projections extending above a top surface of said wheel mount member and formed with a diametrically opposed slot for accepting said latch member in said retracted position, and

wherein a spring is positioned underlying said latch member and positioned within a blind bore formed to an upper surface of said wheel mount and axially with an underlying threaded bore for securement to said threaded boss, and

wherein said wheel mount is formed with a lower clyindrical exterior surface and an upper conical surface, and said upper conical surface is aligned with a lower tapered nose formed to said lower portion of said main body, and

wherein a plurality of threaded rods are securable within aligned and opposed threaded bores formed within said annular projections of said wheel mount and confronting bores formed within said positioning cylinder to spatially align and position said positioning cylinder relative said wheel mount.

4,875,820

CONVERTIBLE GRAIN BIN SWEEP UNLOADER

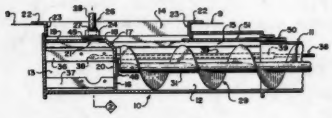
Henry P. Lepp, and Herman P. Lepp, both of P.O. Box 113, Rivers, Manitoba, Canada R0K 1X0

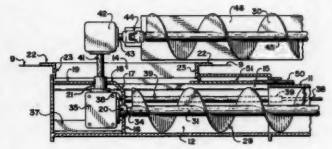
Filed Mar. 30, 1988, Ser. No. 175,346

Int. Cl.[4] B65G *65/46*

U.S. Cl. 414—306 **23 Claims**

1. In an apparatus for discharging bulk material through a central bottom outlet opening of a storage bin, said outlet opening being connected by a discharge sleeve, adapted to contain a discharge conveyor, to a discharge port, said outlet opening having mounting means for a sweep conveyor within said bin, the improvement wherein said mounting means comprises first means to mount a sweep conveyor having drive means independent of said discharge conveyor and second





means to mount gearing means drivably connecting said discharge conveyor to a sweep conveyor.

4,875,821

FRONT END LOADING ENCLOSED SEMI TRAILER

David D. Oren, 1270 Payne Ave., St. Paul, Minn. 55101

Continuation of Ser. No. 880,706, Jul. 1, 1986, abandoned. This application Apr. 20, 1988, Ser. No. 185,320

Int. Cl.[4] B60P *1/28*

U.S. Cl. 414—481 **7 Claims**

1. A substantially enclosed semi trailer, comprising:

(a) hitch means proximate a front end of the semi trailer for interconnection to and support by a tractor at the front end of the semi trailer;

(b) wheel assembly means for supporting a back end of the trailer above the surface of the ground;

(c) extensible jack means disposed proximate the front end of the semi trailer for raising and lowering the front end of the semi trailer;

(d) door means at the front end of the semi trailer for allowing entrance into the semi trailer, whereby when lowered, the semi trailer can be loaded from the front end; and

(e) landing gear means for supporting the front end of the semi trailer above the surface of the ground.

4,875,822

QUICK-COUPLE L-BAR SLEEVE ASSEMBLY FOR WHEEL LIFT

Ronald R. Nespor, Sharpsville, Pa., assignor to Chevron, Inc., Mercer, Pa.

Filed Jun. 9, 1988, Ser. No. 204,454

Int. Cl.[4] B60P *3/12*

U.S. Cl. 414—563 **5 Claims**

1. In a wheel lift assembly comprising

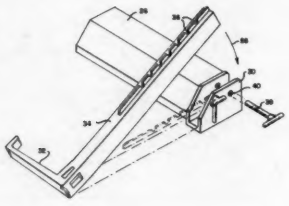
oppositely extending telescopic wheel support sleeves,

wheel support cradles attached to the outer ends of said sleeves,

each of said cradles having connector arm means for securing said cradles to the outer ends of said sleeves so that

said sleeves and said cradles cooperate to retain and support the wheels of a towed vehicle,

open top shoe means at the outer end of each of said sleeves, each of said open top shoe means including a bottom wall for receiving said connector arm means and a pair of side walls secured to and extending upwardly from said bottom wall,



said side walls positioned in spaced relation to form an opening for allowing the end of said connector arm means nearest to said shoe means to enter said shoe means through said opening by swinging downwardly in an arc extending from a position above said shoe means into said shoe means and onto said bottom wall, and

locking means for locking said connector arm means within said shoe means.

4,875,823

ROBOT APPARATUS

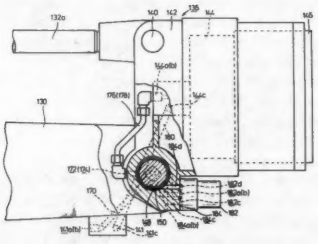
Genzo Fuse; Hiroshi Miwa, and Yoshinobu Kawasaki, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 6, 1987, Ser. No. 117,229

Claims priority, application Japan, Nov. 8, 1986, 61-266157; Nov. 20, 1986, 61-277611; Nov. 25, 1986, 61-180598[U]

Int. Cl.[4] B25J *5/02, 17/00*

U.S. Cl. 414—735 **20 Claims**



1. A robot apparatus comprising:

a robot including an attachment member;

an arm swingably mounted on said attachment member;

a wrist mechanism mounted on said arm;

a connecting member interconnecting said attachment member and said wrist mechanism; and

a running mechanism for displacing said robot in a prescribed direction;

said connecting member including an actuator and a link coupled thereto for displacing said wrist mechanism with said actuator, wherein said wrist mechanism includes a bracket coupled to said arm, rotative drive source disposed in said bracket, a rotatable body rotatable by said rotative drive source, and a support shaft by which said bracket is supported on said arm, said support shaft and said bracket having fluid passages defined therein for supplying fluid under pressure to actuate said rotative drive source.

4,875,824

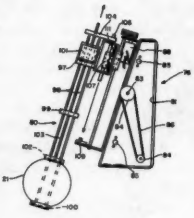
WAFER TRANSFER APPARATUS

Rolf Moe, Alameda; David J. Corrieu, Hayward, and John E. Premeau, Fremont, all of Calif., assignors to Biorne Enterprises, Inc., Hayward, Calif.

Filed Feb. 1, 1988, Ser. No. 150,784

Int. Cl.[4] B65G *65/02, 49/04*

U.S. Cl. 414—751 **3 Claims**



1. A transfer mechanism for a pluality of thin round wafers comprising a base, a first screw having a first axis mounted for rotation in said base, a first motor for driving said first screw in either direction,

a first housing having a first nut mating with said first screw and reciprocable relative to said base along said first axis, a second screw having a second axis perpendicular to said first axis mounted for roatation in said first housing, a second motor for driving said second screw in either direction,

a second housing having a second nut mating with said second screw and reciprocable relative to said first housing along said second axis.

at least one lift device fixed to said second housing at its proximal end and having a distal end comprising grip means on said distal end for detachably gripping sequentially each individual wafer for individually moving each said wafer along said second axis and then moving each individual wafer along said first axis, each said lift device comprising a first rod, first clamp means for clamping the proximal end of said first rod relative to said second housing, first guide means fixed to the distal end of said first rod and wafer grip means spaced up from said first guide means, a second rod connected to said wafer grip means and parallel to and slidable relative to said first rod, second guide means for maintaining said rods in parallelism, a third rod fixed for movement with said second rod, third guide means in said second housing for said third rod and a stop on said first housing engageable with said third rod when said second housing approaches its maximum movement along said second axis to move said grip means away from said first guide means to release a wafer.

4,875,825

METHOD FOR AUTOMATED CASSETTE HANDLING

Barclay J. Tullis, Palo Alto; John S. Bailey, Sunnyvale; D. R. Gunawardena, Union City, and Ulrich Kaempf, Los Altos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 72,181, Jul. 9, 1987, which is a continuation of Ser. No. 759,013, Jul. 24, 1985, Pat. No. 4,705,444. This application Nov. 10, 1987, Ser. No. 119,356

Int. Cl.[4] B65G *65/02*

U.S. Cl. 414—786 **6 Claims**

1. A method for automatically transporting integrated circuit wafers held in a wafer cassette within a canopy, said

canopy coupled to a piece of integrated circuit processing equipment, said method comprising the steps of:

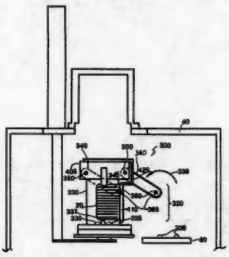
(a) placing the cassette on an interface port handle of an interface port of the canopy;

(b) actuating a switch coupled to a controller;

(c) lowering the casette on the interface port handle into the canopy;

(d) positioning a cassette handler into conjunction with the cassette;

(e) gripping the cassette with a gripper coupled to the cassette handler;



(f) swinging a wafer depressor partially moounted on an upper portion of and cantilevered from the cassette handler to push and retain wafers within the cassette;

(g) swinging the cassette handler in a substantially constant plane with respect to the canopy to transport the cassette from the interface port handler to a processing equipment cassette handler without significantly changing the planar orientation of the cassette with respect to the canopy;

(h) swinging the wafer depressor to release the wafers within the cassette; and

(i) ungripping the cassette, wherein the steps (c) through (i) are performed under the control of a controller without operator intervention.

4,875,826

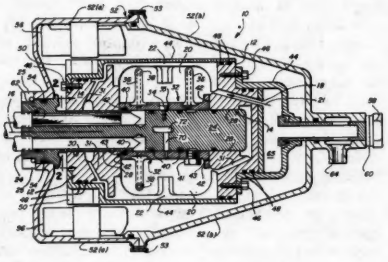
PITOT PUMP ASSEMBLY FOR A ROTATING FLUID MANAGEMENT DEVICE

John Readman, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 26, 1988, Ser. No. 224,344

Int. Cl.[4] F04D *1/12*

U.S. Cl. 415—89 **10 Claims**



8. A pitot pump comprising;

a rotating drum including a bore, said rotating drum having a cavity between its two axial ends in which fluid is received, said rotating drum having at least one radially extending opening;

a shaft inserted within the bore of said rotating drum and axially supported therein, said shaft including a fluid passage extending throughout a portion of its axial length, said shaft having one or more sealing and bearing surfaces between said shaft and rotating drum;

a unitary pitot sub-assembly disposed within said cavity of said rotating drum, said pitot sub-assembly inserted through said radial opening of said rotating drum, said pitot assembly having one or more radially extending pitot tubes, said tube(s) having an opening to receive fluid from within said cavity of said rotating drum;

means on said rotating drum and rotatable therewith for sealing said opening; and

an outer housing secured to said stationary shaft, said housing encasing said rotating drum.

4,875,827

FLUID PUMP AND METHOD FOR MAKING THE SAME

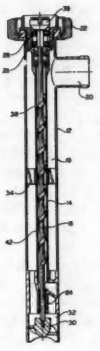
Alois Gschwender, Neubulach; Horst Krüger, Sulzfeld, and Bernhard Schleifer, Kuernbach, all of Fed. Rep. of Germany, assignors to Flux Geräte GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 24, 1987, Ser. No. 137,768

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644515; Aug. 12, 1987, 3726794

Int. Cl.[4] F04D *13/08*

U.S. Cl. 415—111 **22 Claims**



15. A fluid pump, said pump comprising:

a pump housing;

a drive shaft rotatably mounted within said pump housing;

a bearing support member mounted within said pump housing and fitted over said drive shaft;

at least one helical shaped bearing seated between said drive shaft and said bearing support member for supporting said drive shaft within said support member and for permitting the rotation of said drive shaft therein, said helical shaped bearing defining an exterior helical surface and an interior helical surface, the tension within said helical bearing urging said exterior helical surface against said support member to prevent movement of said helical bearing relative to said support member, said helical shaped bearing further defining a generally helical space between said drive shaft and said support tube; and

propeller means mounted to said drive shaft for propelling fluid upon rotation of said drive shaft.

4,875,828

TURBO-ENGINE HAVING MEANS FOR CONTROLLING THE RADIAL GAP

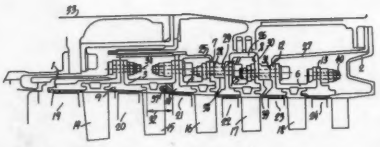
Franz Willkop, Munich; Gerhard Zahring, Worthsee; Robert Rutsch, Karlsfeld; Joachim Popp, Dachau, and John Eberhard, Munich, all of Fed. Rep. of Germany, assignors to MTU Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 936,584, Dec. 22, 1986, abandoned. This application Jan. 23, 1989, Ser. No. 281,531

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509192

Int. Cl.[4] F01D 5/08

U.S. Cl. 415—173.4 8 Claims



1. A thermal turbo-engine comprising a rotor which rotates about an axis of rotation and includes a plurality of axially spaced rows of rotor blades, an outer casing, an inner casing connected to said outer casing and including a plurality of axially spaced annular shell elements surrounding the rotor, a plurality of annular supports juxtaposed in alternation between adjacent shell elements, each support carrying a run-in layer facing a respective row of rotor blades, means detachably connecting the shell elements and the supports to one another, said shell elements each including opposite radial flanges, said supports each including a radial web engaged between the flanges of adjacent shell elememts, a plurality of stators disposed between respective adjacent supports, each stator including a stator vane and a foot, the foot of each stator being held and supported between the adjacent supports with the respective radial web dispoed between the radial flanges of adjacent shell elements, said radial web of each of said supports and the adjacent radial flanges of said shell elements forming a respective substantial mass which is aligned outside and around each row of rotor blades to resist thermal deformation and maintain constant minimized gaps formed between each row of rotor blades and its respective run-in layer over the operating range of the engine, fastening elements detachably connecting said shell elements and supports together and annular cover rings covering said shell elements to isolate the shell elements from fluid removed from fluid flowing in the engine, said inner casing defining removal ports for said fluid flowing in the engine, which ports lead to passages formed between respective cover rings and adjacent selected ones of said radial webs, and heat barrier layers on said cover rings and said ones of the radial webs which form said passages.

4,875,829

MARINE PROPELLER

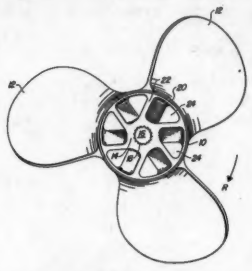
Gerbrig W. Van der Woude, Rock Island, Ill., assignor to Van Der Woude Plastic Corporation, Moline, Ill.

Filed Aug. 31, 1988, Ser. No. 239,495

Int. Cl.[4] B63H 1/20

U.S. Cl. 416—2 2 Claims

1. A marine propeller drivable by a power source including an internal combustion engine and a drive shaft, the propeller being of unitary, one-piece molded construction of lightweight, rigid, high-strength, non-metallic material having a unitary central structure in the form of a nave centered on the axis of rotation of the propeller and including an integral, coaxial hub, an integral annular wall concentrically and spacedly surrounding the hub and a plurality of qui-angularly spaced apart spokes extending between and integral with the hub and the interior surface of the annular wall and providing a like plurality of fore-and-aft engine-exhaust passages, the hub having an axially central opening for axis-wise mounting or dismounting from the shaft and including shaft-engaging splines integral with the hub and configured and dimensioned



to shear in response to overloads on the propeller of a predetermined value below the load level at which the power source would be damaged, and a plurality of propeller blades integral with and radiating from the outer surface of the annular wall.

4,875,830

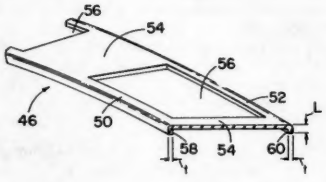
FLANGED LADDER SEAL

Edmund D. Trousdell, Tolland, and Robert F. Kasprow, Wethersfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 18, 1985, Ser. No. 756,462

Int. Cl.[4] F01D 5/30

U.S. Cl. 416—215 3 Claims



1. A gas turbine engine rotor assembly comprising:

(a) an annular rotor disk having a rim and a blade retaining slot extending circmferentially about said rim, said disk having an axis, and said slot having a base and opposed, axially spaced apart sidewalls;

(b) a plurality of rotor blades arranged in a circumferential row about said disk rim, each blade having a blade root disposed within said slot and a platform spaced radially outwardly of said root, said platforms of adjacent blades having an axially extending gap therebetween, each platform having a radially inwardly facing underside surface inclined radially outwardly in opposite axial directions away from said root, said underside surface radially spaced from said rim so as to define a circumferentially extending gap therebetween; and

(c) an annular ladder seal disposed radially inwardly of said blade platforms and between said platforms and said slot base, said seal having a pair of axially spaced apart, circumferentially extending strips and a plurality of circumferentially spaced apart crossbars extending axially from one strip to the other and integral with both strips, each strip having a circumferential, radially inwardly extending flange axially adjacent to one of said slot sidewalls, wherein said seal is adapted to bend due to centrifugal forces during engine operation such that each of said crossbars contacts said underside surfaces of adjacent

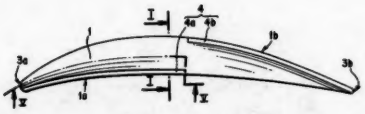
blade platforms to seal said gap extending axially between said platforms, and each flange moves radially outwardly as well as axially and contacts its respective slot sidewall to seal said gap extending circumferentially between said rim and said platform underside surfaces.

4,875,831

COMPRESSOR ROTOR BLADE HAVING A TIP WITH ASYMMETRIC LIPS

Jean Y. L. Fetiveau, Soisy sur Seine, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA", Paris, France

Filed Nov. 18, 1988, Ser. No. 972,730
Claims priority, application France, Nov. 19, 1987, 87 15981
Int. Cl.[4] F04D *29/38*
U.S. Cl. 416—228 **4 Claims**



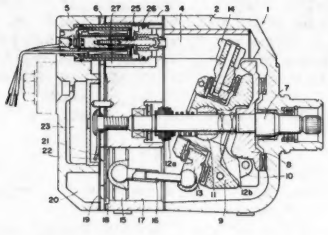
1. A compressor rotor blade wherein the tip of said blade is provided with at least one discontinuous sealing lip, said lip consisting of two half lips which are arranged one at each side of said blade in an assymetrical manner with respect to a transverse sectional plane of said blade tip, wherein a first one of said two half lips is located on the concave side of said blade and extends from the leading edge of said blade to the vicinity of the median plane perpendicular to the chord of said blade, and a second one of said half lips is located on the convex side of said blade and extends from said median plane to the trailing edge of said blade.

4,875,832

PRESSURE CONTROL VALVE FOR VARIABLE DISPLACEMENT SWASH PLATE TYPE COMPRESSOR

Nobuhiko Suzuki, Konan, and Tetuya Aoki, Setagaya, both of Japan, assignors to Diesel Kiki Co., Ltd. and Fujikoki Manufacturing Co., Ltd., both of Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 286,121
Claims priority, application Japan, Dec. 28, 1987, 62-336641
Int. Cl.[4] F04B *1/26*; F16K *31/02*
U.S. Cl. 417—222 **2 Claims**



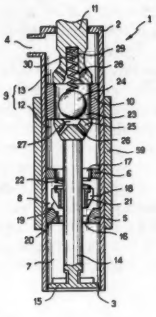
1. A pressure control valve for a variable displacement swash plate-type compressor, comprising:
- a valve case including a first connection hole for communicating with a crank chamber and a second connection hole for communicating with an intake chamber;
- an end cap secured to said valve case;
- a valve element disposed within said valve case and movable along an axis for adjusting the degree of communication between said first and said second connection holes;
- a valve seat for engagement with said valve element, said valve seat being mounted on said valve case for adjustment along said axis;
- a solenoid for controlling the movement of said valve element, said solenoid including:
  - an electromagnetic coil disposed within said case;
  - a stator connected to said coil and including a through-hole one end of said stator having a substantially planar surface disposed substantially normal to said axis;
  - armature means mounted for reciprocation with respect to said coil, at least a portion of a front end of said armature means having a substantially planar surface disposed normal to said axis and confronting said one end of said stator, a rear end of said armature means being loosely received with radial clearance in said end cap;
- a biasing spring extending between said rear end of said armature means and said end cap for biasing said armature means toward said stator;
- a stem secured to said valve element at a front end of said stem and extending through said through-hole, a rear end of said stem contacting said armature means; and
- a bellows for displacing said valve element along said axis in response to the pressure in said intake chamber, said bellows including a first end connected to said stem and a second end connected to said valve case, the interior of said bellows communicating with the atmosphere to equalize the pressure within said bellows.

4,875,833

PUMPING OF HIGH VISCOSITY MATERIALS

Michel Canaud, Paris, and Philippe Dewitte, Thourotte, both of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Feb. 20, 1987, Ser. No. 19,378
Claims priority, application France, Feb. 20, 1986, 86 02344; Jan. 22, 1987, 87 00709; Jan. 22, 1987, 87 00710
Int. Cl.[4] F04B *5/00, 21/00*
U.S. Cl. 417—259 **23 Claims**



1. A reciprocating vane pump for thick materials having a viscosity greater than 35,000 poises, comprising:
- a pump body having a material inlet and a material outlet;
- a piston slidably positioned in said pump body;
- a rod fixed to said piston and extending therefrom along the length of said pump body to said material inlet;
- a vane fixed to a distal end of said rod at said material inlet;
- at least two partitions spaced along the length of said pump body to separate the interior of said pump body into a plurality of stages, said partitions having ports for permitting passage of said rod, said ports each having a clearance with respect to said rod large enough to permit free passage of the material therepast; and
- check valves associated with at least one of said ports and with said piston for permitting material flow only from said inlet to said outlet, said check valves each providing

a clearance, when open, sufficient to permit free passage of the material therepast, whereby material is pumped from said inlet to said outlet by reciprocation of said piston in said pump body,

wherein said check valve associated with said at least one port comprises a ring shaped valve member surrounding said rod with a diametrical clearance of between 1 and 2.5 mm and having a bronze bearing surface for guiding said rod.

4,875,834

WOBBLE PLATE TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

Teruo Higuchi; Kiyoshi Terauchi, both of Isesaki; Kazuhiko Takai, Maebashi; Sei Kikuchi, and Hideto Kobayashi, both of Isesaki, all of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Feb. 19, 1988, Ser. No. 157,782

Claims priority, application Japan, Feb. 19, 1987, 62-36443; Feb. 19, 1987, 62-36444

Int. Cl.[4] F04B *1/14*

U.S. Cl. 417—269 **10 Claims**

1. In a wobble plate type compressor with a variable displacement mechanism, said compressor comprising a compressor housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent said cylinder block, a piston slidably fitted within each of said cylinders, a drive shaft rotatably supported in said housing, a rotor fixed on said drive shaft and further connected to a variably inclined plate, a wobble plate adjacent said inclined plate with each of said plurality of pistons coupled at one end with said wobble plate, rotational motion of said inclined plate converted into nutational motion of said wobble plate, and a rotation preventing mechanism to prevent rotational motion of said wobble plate, the improvement comprising:

said rotation preventing mechanism comprising a guide plate having an upper surface extending within said crank chamber and a cylindrical block disposed within a hole formed in an extended portion of said wobble plate, said cylindrical block including a vertical groove formed therein and extending to an upper interior surface of said cylindrical block, said groove slidably fitted on said guide plate, said rotation preventing mechanism also including retaining means for retaining said cylindrical block in said hole such that said upper interior surface of said groove does not contact said upper surface of said guide plate.

4,875,835

VARIABLE DISPLACEMENT COMPRESSOR

Nobuyuki Nakajima; Kenichi Inomata; Masaya Moruta; Toshio Yamaguchi, and Kazuo Eitai, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Nov. 15, 1988, Ser. No. 271,303

Claims priority, application Japan, Dec. 24, 1987, 62-327658

Int. Cl.[4] F04B *49/02*; F04C *29/08*

U.S. Cl. 417—295 **4 Claims**

1. A variable displacement compressor, comprising:

a compressor cylinder having opposite sides;

a pair of side blocks, one said side block connected to each opposite side of said compressor cylinder to thereby define a cylinder chamber inside said compressor cylinder;

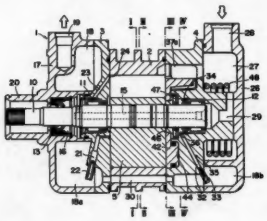
a rotor, rotatably disposed in said cylinder chamber, having thereon a plurality of radially movable sliding vanes;

said compressor cylinder, said rotor, said side blocks and said plurality of vanes together defining a plurality of variable volume compression chambers varying in volume with rotation of said rotor in said cylinder chamber;

a pair of heads, one said head attached to a respective said side block;

displacement adjustment means incorporated in a first said side block and its respective head for controlling the compression starting timing in said plurality of compression chambers;

said first side block having a first oil sump for retaining therein a lubricating oil;



a second oil sump for retaining oil therein exposed to a high pressure output of said compression chambers;

a connection passage in said compressor cylinder connecting said first and second oil sumps to thereby maintain said oil in said first oil sump under a high pressure;

a shaft supporting said rotor, said shaft having a first end supported by said first side block;

said first side block having a bearing chamber therein extending circumferentially about the outer peripheral surface of said shaft;

a lubrication oil supply passage means in said first side block connecting said first oil sump with said displacement adjustment means, said lubrication oil supply passage means comprising said bearing chamber and an oil passage in said first side block interconnecting said first oil sump and said bearing chamber.

4,875,836

SELF-SUCKING PUMP APPARATUS FOR LIQUIDS

Paul Zehnder, Birmenstorf, Switzerland; Hans-Ulrich Niklaus, Windisch, Switzerland; Engelbert Schmiedl, Rohrdorf, Switzerland, and Franz Patri, Frankfurt am Main, Fed. Rep. of Germany, assignors to K. Rüttschi AG, Brugg, Switzerland

Filed Jan. 11, 1988, Ser. No. 141,807

Claims priority, application Switzerland, Jan. 15, 1987, 132/87

Int. Cl.[4] F04B *17/00*

U.S. Cl. 417—360 **5 Claims**

1. A self-sucking pump apparatus for liquids, comprising:

a pump containing a motor part;

said pump being constructed as a structural unit incorporating said motor part;

a suction device constructed as a structural unit;

said suction device defining a hollow compartment bounded by a first wall for housing said structural unit inclusive of said motor part of said pump;

self-centering connection means for interconnecting in a self-centering manner said suction device and said structural unit inclusive of said motor part of said pump in the hollow compartment of the suction device;

connecting means for engagement by remotely controlled manipulation means for releasably connecting said struc-

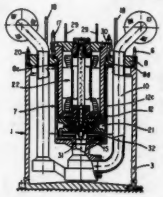
tural unit inclusive of said motor part of said pump with said suction device;

said structural unit of said pump containing assembly means for engagement by remotely controlled mounting means for selectively inserting or removing in substantially coaxial manner said structural unit of said pump into and out of said hollow compartment of said suction device;

a closable pressure container bounded by a second wall for receiving said suction device;

connecting means for engagement by remotely controlled manipulator means for releasably connecting said suction device with said closable pressure container;

said suction device containing assembly means for engagement by remotely controlled mounting means for selectively inserting or removing in substantially coaxial manner said suction device into or out of said closable pressure container;



said suction device further containing an infeed line for conducting fluid to be pumped to said pump and a discharge line for conducting pumped fluid away from said pump;

closing means for closing said closable pressure container in the inserted state of said structural unit of said pump and said suction device in said closable pressure container;

said discharge and infeed lines extending through said closing means in a sealed relationship;

said structural unit of said pump, said suction device bounded by said first wall and said closable pressure container bounded by said second wall constituting, when inserted into one another, a self-contained structural unit which is substantially hermetically closed on all sides except for said infeed line and said discharge line and which self-contained structural unit encloses said motor part of said pump.

4,875,837

TWO-FLOW-PASSAGE TYPE EXHAUST GAS DRIVEN TURBO-CHARGER

Saburo Usami, Hitachi; Kyoichi Uchiyama, Kashiwa, and Satoshi Suzuki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 8, 1986, Ser. No. 904,401
Claims priority, application Japan, Sep. 18, 1985, 60-204258
Int. Cl.[4] F04B *17/00*
U.S. Cl. 417—407 **11 Claims**

1. A two-flow-passage type exhaust gas driven turbocharger comprising:

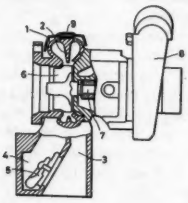
a turbine casing having a scroll portion into which a high temperature exhaust gas flows;

an annular partition provided in said scroll portion of said turbine casing and extending radially inwardly from a root portion at an inner surface of said scroll portion to a free end portion to radially divide said scroll portion into two parts to thereby form two flow passages for high temperature exhaust gas;

a radial flow type turbine wheel disposed in said turbine casing and driven by a high-temperature exhaust gas introduced therein through said scroll portion;

a compressor connected to said turbine wheel and driven by said turbine wheel so as to supercharge an engine;

an outer surface of a portion of said turbine casing from which said partition extends radially inwardly is covered



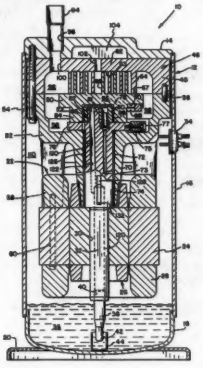
with a heat-insulating material so that a heat release from the outer surface of said portion of said turbine casing is reduced thereby reducing a temperature differential between said root portion and said free end portion of said partition.

4,875,838

SCROLL COMPRESSOR WITH ORBITING SCROLL MEMBER BIASED BY OIL PRESSURE

Hubert Richardson, Jr., Brooklyn, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed May 12, 1988, Ser. No. 193,398
Int. Cl.[4] F04C *18/04, 27/00, 29/02*
U.S. Cl. 418—55 **18 Claims**



1. A scroll-type compressor for compressing refrigerant fluid, comprising:

a hermetically sealed housing including therein a discharge pressure chamber at discharge pressure and a suction pressure chamber at suction pressure;

an oil sump within said discharge pressure chamber;

suction inlet means for conveying refrigerant from outside of said housing to said suction pressure chamber;

discharge outlet means for conveying refrigerant from said discharge pressure chamber to outside of said housing;

a fixed scroll member within said housing including an involute fixed wrap element;

an orbiting scroll member having a top surface and a bottom surface, said orbiting scroll member including an involute orbiting wrap element on said top surface, said fixed and orbiting scroll members being generally axially aligned and having an interface therebetween whereat said fixed and orbiting wraps are intermeshed, a radially outer portion of said interface communicating with said suction

pressure chamber and a radially inner portion of said interface communicating with said discharge pressure chamber, said orbiting scroll member being adapted to orbit with respect to said fixed scroll member such that refrigerant entering said interface at said radially outer portion is compressed and subsequently discharged at said radially inner portion;

drive means for causing said orbiting scroll to orbit;

axial compliance means for applying a net axial force on said bottom surface of said orbiting scroll member toward said fixed scroll member, said compliance means comprising means for exposing a radially outer portion of said bottom surface to said suction pressure chamber and a radially inner portion of said bottom surface to oil from said oil sump, said oil from said oil sump being at substantially discharge pressure; and

seal means for substantially sealing between said radially outer portion exposed to said suction pressure chamber and said radially inner portion exposed to said oil from said oil sump, whereby said seal means establishes an interface between a radially inner, oil-filled chamber and a radially outer gaseous chamber.

4,875,839

SCROLL MEMBER FOR USE IN A POSITIVE DISPLACEMENT DEVICE, AND A METHOD FOR MANUFACTURING THE SAME

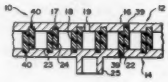
Hirotsugu Sakata, Chigasaki; Hiroaki Murasaki, Yokohama; Makoto Hayano, Tokyo; Hitoshi Hattori; Naoya Morozumi, both of Yokohama; Kouichi Yoneyama, Chigasaki; Isao Suzuki, Tokyo; Junji Sone, Yokohama, and Shigemi Nagatomo, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

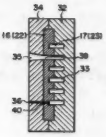
Filed Mar. 18, 1988, Ser. No. 170,354

Claims priority, application Japan, Mar. 20, 1987, 62-64316; Sep. 30, 1987, 62-243993; Dec. 4, 1987, 62-305721

Int. Cl.[4] F01C *1/04;* F04C *18/04;* B28B *1/24, 7/18*

U.S. Cl. 418—55 **19 Claims**





1. A scroll member comprising:

an end plate having a spiroidal groove on one side thereof, and a through-hole communicating with the groove; and

a resin wrap joined to the groove of the end plate so as to protrude from the surface of the end plate,

said wrap being formed by molding, and said through-hole and said groove being filled with part of said wrap.

4,875,840

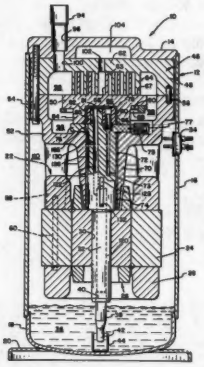
COMPRESSOR LUBRICATION SYSTEM WITH VENT

William C. Johnson, Onsted; Hubert Richardson, Jr., Brooklyn, and Thomas R. Barito, Tecumseh, all of Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed May 12, 1988, Ser. No. 193,548

Int. Cl.[4] F04C *18/04, 29/02;* F01M *11/02*

U.S. Cl. 418—55 **22 Claims**



1. A hermetic compressor, comprising:

a housing;

an oil sump within said housing;

compressor means within said housing for compressing refrigerant fluid, said compressor means including a drive input comprising a bearing;

a rotatable crankshaft having a first end portion disposed within said oil sump and a second opposite end portion rotatably journalled within said bearing, said crankshaft including a first generally axial oil passageway in fluid communication with said oil sump and extending the length of said crankshaft through said first and second end portions thereof;

pump means, operable upon rotation of said crankshaft, for pumping oil from said oil sump through said first oil passageway; and

vent means, including a second generally axial oil passageway extending through said second end portion of said crankshaft, for returning oil pumped through said first oil passageway back to said oil sump, said first oil passageway being in fluid communication with said second oil passageway.

4,875,841

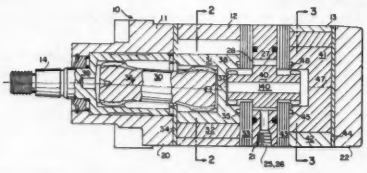
STAGGERED ROTOR GEROTOR DEVICE

Hollis N. White, Jr., 243 Pyle La., Hopkinsville, Ky. 42240

Continuation of Ser. No. 77,869, Jul. 27, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 304,924

Int. Cl.[4] F03C *2/08*

U.S. Cl. 418—60 **17 Claims**



1. In a device having two drive shaft connected gerotor

structures, each having a rotor oriented with a certain fixed neutral phase relationship in respect to its stator, the improvement of the neutral phase relationship of one gerotor structure occurring at a different time than the neutral phase relationship of the other gerotor structure to smooth the linearity of the output torque of the device.

4,875,842

AXIAL FLOW FLUID COMPRESSOR

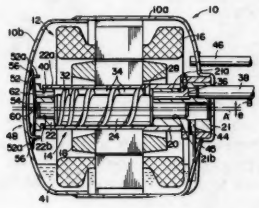
Toshikatsu Iida, Yokohama; Takayoshi Fujiwara, Kawasaki, and Tetsuo Fukuda, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 9, 1988, Ser. No. 242,217

Claims priority, application Japan, Sep. 10, 1987, 62-227320; Jan. 5, 1988, 63-494

Int. Cl.[4] F04B *39/00*

U.S. Cl. 418—220 **17 Claims**



1. A fluid compressor comprising:

a cylinder having a suction-side end and a discharge-side end;

a columnar rotating body located in the cylinder to extend in the axial direction thereof and be eccentric thereto, and rotatable relative to the cylinder while part of the rotating body is in contact with the inner peripheral surface of the cylinder, said rotating body having a spiral groove on the outer peripheral surface thereof, said groove having pitches narrowed gradually with a distance from the suction-side end to the discharge-side end of the cylinder;

a spiral blade fitted in the groove to be slidable, substantially in the radial direction of the rotating body, having an outer surface in tight contact with the inner peripheral surface of the cylinder, and dividing the space between the inner peripheral surface of the cylinder and the outer peripheral surface of the rotating body into a plurality of operating chambers;

a pair of bearings for rotatably supporting both ends of the cylinder and rotatably supporting corresponding ends of the rotating body so as to hold the rotating body at a predetermined position with respect to the cylinder;

drive means for relatively rotating the cylinder and the rotating body so as to sequentially transporting a fluid, which is drawn into the cylinder from the suction-side end thereof, toward the discharge-side side of the cylinder through the operating chambers;

a closed case for housing said constituent members; and

support means for supporting one of said bearings so as to be movable in the radial direction of the cylinder relative to the case.

4,875,843

VACUUM MOLD FOR MANUFACTURING CUSHIONS WITH BACK-FOAMED COVERS

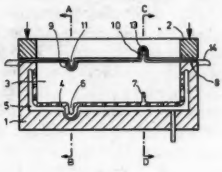
Volker Onnenberg, Wiehl, and Günter Möllmann, Hagen, both of Fed. Rep. of Germany, assignors to Fritsche-Mollmann GmbH & Co., Lotte and Bayer Aktiengesellschaft, Leverkusen, both of, Fed. Rep. of Germany

Filed Sep. 13, 1988, Ser. No. 243,868

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 3731994

Int. Cl.[4] B29C *45/14*; B32B *5/18*

U.S. Cl. 425—4 R **4 Claims**



1. A vacuum mold for manufacturing a cushion with a back-foamed cover, said mold comprising an upper mold half and a lower mold half, said lower mold half comprising a mold cavity having longitudinal contours and being connected to a vacuum source such that when a vacuum is applied, said cover is pulled into said cavity, wherein said cavity is surrounded by a rim, said rim having contours thereon running the same direction as the contours in said mold cavity, and wherein a tenter is associated with said rim, said tenter having negative contours corresponding to the contours on said rim, and wherein said tenter is adapted to hold down said cover on said rim while at the same time allowing said cover to slide upon application of vacuum to said cavity.

4,875,844

SPINNERET ASSEMBLY FOR SHEATH-CORE TYPE COMPOSITE FIBERS

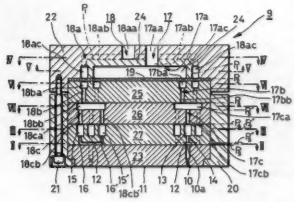
Sadaaki Nakajima, and Taiju Terakawa, both of Shiga, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Feb. 15, 1989, Ser. No. 310,585

Claims priority, application Japan, Feb. 17, 1988, 63-32789

Int. Cl.[4] D01D *4/06*

U.S. Cl. 425—131.5 **4 Claims**



1. A sheath-core type composite spinneret assembly (9) comprising in combination:

(1) an annular array of multiple spinning holes (10) which are provided at least in one row and open on a spinning plane (11) of said spinneret assembly (9),

(2) a spinning-stock-solutions-combining-passage (12) in the form of an endless annulus, which is of a shallow depth and provided on its spinning-stock-solution-feeding-side of said spinning holes (10) and in parallel with said spinning plane (11) per one row of said array of said spinning holes (10), and on which inlets (10a) of said spinning holes (10) are open,

(3) a single core-component-stock-solution-distributing-passage (13) in the annular form arranged along said spinning-stock-solutions-combining-passage (12) on its spinning-stock-solution-feeding-side; core-component-stock-solution-outlet-passages (14) provided to guide a core-component-stock-solution from said core-component-stock-solution-distributing-passage (13) to said spinning-stock-solutions-combining-passage (12) and open in said spinning-stock-solutions-combining-passage (12) at positions located coaxially with respect to said spinning holes (10); two sheath-component-stock-solution-distributing-passages (15, 15'), both in the annular form, arranged in parallel with said spinning plane (11) with said core-component-stock-solution-distributing-passage (13) being sandwiched therebetween; and sheath-component-stock-solution-outlet-passages (16, 16') provided to guide a sheath-component-stock-solution from said sheath-component-stock-solution-distributing-passages (15, 15') to said spinning-stock-solutions-combining-passage (12) and respectively open on both side edges of said spinning-stock-solutions-combining-passage (12) at positions located substantially in the middle of the adjacent inlets (10*a*) of said holes (10), and

(4) a core-component-stock-solution-feeding-passage (17) and a sheath-component-stock-solution-feeding-passage (18) provided to individually feed said core- and sheath-component-stock-solution to said core-component-stock-solution-distributing-passage (13) and said sheath-component-stock-solution-distributing-passages (15, 15').

4,875,845

INJECTION NOZZLE FOR AN INJECTION MOLDING MACHINE

Hitoshi Hara, Funabashi, and Hiroyoshi Sumen, Chiba, both of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

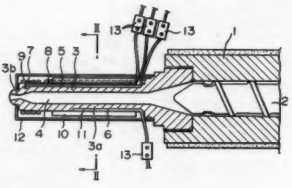
PCT No. PCT/JP88/00312, § 371 Date Nov. 28, 1988, § 102(e) Date Nov. 28, 1988, PCT Pub. No. WO88/07446, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 29, 1988, Ser. No. 298,609

Claims priority, application Japan, Mar. 31, 1987, 62-46691; Aug. 7, 1987, 62-120347

Int. Cl.[4] B29C *45/78*

U.S. Cl. 425—143 **3 Claims**



1. An injection nozzle for an injection molding machine having a nozzle body protruding from a front, end of a heating cylinder thereof, said injection nozzle comprising a plurality of electric heating members each member surrounding a different nozzle body section of said nozzle body and longitudinally arranged side by side, a plurality of temperature detecting members, each of said temperature detecting members detecting the temperature of each respective nozzle body section surrounded by a respective heating member, and a control mechanism for individually controlling said plurality of heating members in accordance with the detected temperatures of said temperature detecting members.

4,875,846

SPINNING APPARATUS

Heinz Reinbold, Petersbergstrasse 5, 5200 Siegburg/Kaldauen, Fed. Rep. of Germany

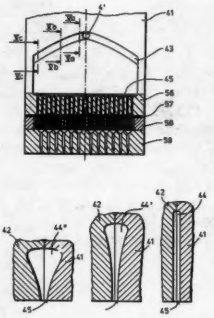
PCT No. PCT/DE86/00467, § 371 Date Aug. 28, 1987, § 102(e) Date Aug. 28, 1987, PCT Pub. No. WO87/03017, PCT Pub. Date May 21, 1987

PCT Filed Nov. 14, 1986, Ser. No. 86,081

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540757

Int. Cl.[4] B29C *47/12*

U.S. Cl. 425—186 **16 Claims**



1. Spinning apparatus for the production of monofilament yarn comprising:

a spinning tool having means defining a channel section for receiving polymer melt and

flow channel means, interconnected between said channel section and a group of nozzles, for widening the flow of polymer melt, said flow channel means having, at least in an upper part thereof, increased cross-sectional area in the direction of polymer flow from the channel section toward the group of nozzles.

4,875,847

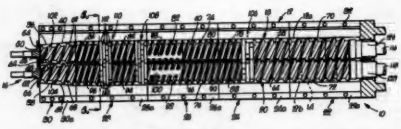
TWIN-SCREW EXTRUDER HAVING RESPECTIVE CONICAL NOSE SCREW SECTIONS

LaVon G. Wenger; Bobbie W. Hauck, and Timothy R. Hartter, all of Sabetha, Kans., assignors to Wenger Manufacturing, Inc., Sabetha, Kans.

Continuation of Ser. No. 165,460, Mar. 2, 1988, abandoned, which is a continuation of Ser. No. 794,252, Oct. 30, 1985, abandoned, which is a continuation of Ser. No. 603,195, Apr. 23, 1984, abandoned. This application Jan. 17, 1989, Ser. No. 298,863

Int. Cl.[4] B29C *47/40*

U.S. Cl. 425—204 **8 Claims**



1. An extruder, comprising:

an elongated barrel presenting an inlet end and an outlet end, a material inlet adjacent said inlet end thereof and a pair of separate, generally tubular, juxtaposed head sections proximal to said outlet end of the barrel and defining respective chambers separated by a central wall, each of said outlet end head sections being of decreasing cross-sectional area

along the length thereof, said outlet end head sections serving to divide and receive material passing through said barrel, said elongated barrel having an outer surface that is imperforate between the outlet end head section and the outlet end of the barrel;

a pair of elongated, juxtaposed, axially rotatable flighted screws positioned within said barrel for moving material therethrough, each of said screws including an elongated, flighted, generally frustoconical outlet end screw section of decreasing cross-sectional area along the length of the outlet end screw section which is substantially complemental with a corresponding one of said outlet end sections, each of said outlet end screw sections having a rearward margin and a forward margin, the length of each of said outlet end screw sections being greater than he greatest diameter of the outlet end screw section,

each of said outlet end screw sections having a peripheral helical flighting portion extending forwardly from said rearward margin of the outlet end screw section, each of said flighting portions intermeshing with the flighting portion of the other outlet end screw section by a predetermined depth of intermesh which progressively decreases the flighting portions extending forwardly from the rearward margins of said end screw sections until the flighting portions completely separate from each other at a point spaced rearwardly from said outlet end of said barrel,

each of said outlet end screw sections extending into and being substantially complementally received by a corresponding outlet end head section for providing a bearing-type support for each of said flighted screws by virtue of passage of material into and through said head sections, and into surrounding relationship to the outlet end screw sections, during operation of said extruder;

restricted orifice die structure; and

means mounting said die structure adjacent the outlet end of said barrel and in a spaced apart relationship to the forward margins of said outlet end section,

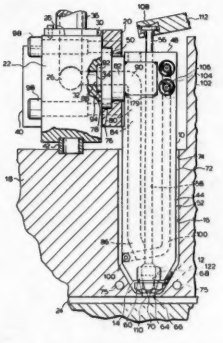
the spacing between said outlet end section forward margins and said die structure being less than the length of one of said generally frustoconical outlet end sections.

4,875,848

INJECTION MOLDING HEATED GATE INSERT AND METHOD

Jobst U. Gellert, 7A Prince Street, Georgetown, Canada L7G 2X1

Filed Feb. 29, 1988, Ser. No. 162,296
Int. Cl.[4] B29C *45/20, 45/72*
U.S. Cl. 425—549 **6 Claims**



1. An elongated injection molding nozzle with a forward end, a rear end and gate insert member removably seated in the forward end of the nozzle, the nozzle having a melt channel extending to a central mouth at the forward end of the nozzle and an integral electrical heating, the gate insert member comprising:

(a) a cylindrical rear portion extending to a rear end of the gate insert member shaped for removable insertion into the forward end of the nozzle a nose portion extending to a forward end of the gate insert member, and an intermediate portion extending between the rear portion and the nose portion,

(b) a central melt bore extending axially through the gate insert member from an inlet at the rear end to an outlet at the forward end, and

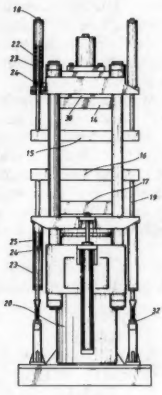
(c) an electrical heating element having a helical portion and a terminal portion, the terminal portion extending to connect to a lead from an external power source, the helical portion being integrally embedded in the gate insert member to extend around the melt bore through the gate insert member.

4,875,849

RUBBER SHAPING MACHINE

Jin S. Huang, and Jin L. Huang, both of No. 1, Lan Tsun Rd., Lan Tsun Li, Feng Yuan, Taichung Hsien, Taiwan

Filed Mar. 14, 1988, Ser. No. 167,776
Int. Cl.[4] B29C *45/67*
U.S. Cl. 425—589 **5 Claims**



1. A rubber shaping machine comprising:

a mold frame;

an upper mold mounted on said mold frame;

an upper middle mold vertically movably mounted on said mold frame and under said upper mold;

a lower middle mold vertically movably mounted on said mold frame and under said upper middle mold;

a lower mold vertically movably mounted on said mold frame and under said lower middle mold;

a main oil cylinder capable of pushing said lower mold upwards;

two auxiliary oil cylinders having their respective spindles connected to two opposite sides of said lower mold and capable of pushing it upwards;

a feeding tube;

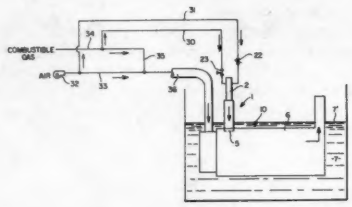
a storing barrel connected to and receiving a rubber material from said feeding tube; and

an injection head device mounted on said storing barrel for injecting said rubber material into a space between said upper and lower molds.

4,875,850
GAS BURNER OF THE BLOWN AIR AND PREMIXTURE TYPE

Francois Cagnou, Paris; Denis Di Paola, Argenteuil; Georges Austruy, Villetaneuse, and André Vinchon, Paris, all of France, assignors to Gaz de France, Paris, France

Filed Nov. 2, 1987, Ser. No. 115,728
Claims priority, application France, Nov. 7, 1986, 86 15556
Int. Cl.[4] F23C 5/08
U.S. Cl. 431—8 1 Claim



1. A method of lighting a pilot burner for a main burner, said pilot having a premixing chamber with separate inlets for air and combustible gas, and a metallic flame-stabilizing grille through which a mixture of air and combustible gas is introduced into a combustion chamber of said main burner, said method comprising:

feeding air and combustible gas through said inlets into said premixing chamber at a ratio of air:combustible gas less than the stoichiometric ratio thereof and passing the resulting sub-stoichiometric mixture through said grille into said combustion chamber;

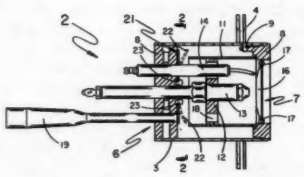
feeding a mixture of air and combustible gas directly into said combustion chamber of said main burner of a ratio of air:combustible gas sufficiently greater than the stoichiometric ratio thereof to provide a stoichiometric mixture of the gases fed directly into said combustion chamber and of the gases fed through said flame-stabilizing grille, and directing toward said grille at least a portion of the mixture of gases which were directly fed into said combustion chamber; and

igniting the mixture of air and combustible gas which passes through said grille from said premixing chamber.

4,875,851
STEADY STATE FUEL BURNER ASSEMBLY FOR A HEAT EXCHANGER AND METHOD OF OPERATING SAME

Paul A. Mutchler, St. Louis County, Mo., assignor to Engineered Air Systems, Inc., St. Louis, Mo.

Filed Aug. 29, 1988, Ser. No. 237,445
Int. Cl.[4] F23N 3/02
U.S. Cl. 431—6 19 Claims



1. In combination with a steady state normally continuous, even flow fuel burner assembly for a heat exchanger of a space heater comprising:

a burner duct having an upstream inlet end and a downstream outlet end, said inlet end being adapted to be connected to a source of normally continuous, even flow combustion air and said outlet end being adapted to accommodate a burner flame wall proximate thereto;

spaced fuel outlet and igniter means selectively positioned in said burner duct to introduce a continuous, even flow of fuel to ignite with said combustion air to provide a flame wall proximate said outlet end; and

valve control means cooperating with said upstream inlet end of said burner duct, said valve control means opening during start-up operations and being adaptable only upon initial high explosive pressures created by the ignition of said fuel with said combustion air to throttle said upstream inlet of said burner duct to reduce the further introduction of combustion air until the initial products of combustions are exhausted to lower the pressure within said burner duct to a preselected lower pressure level to permit said valve control means to open said upstream inlet of said burner assembly operations for continuous, even flow of further unthrottled combustion air to said burner duct to maintain a normal steady state flame wall free of pulsations proximate said outlet end of said burner duct.

15. A method of operating a steady state normally continuous, even flow fuel burner assembly for a heat exchanger of a space heater comprising:

introducing fuel and combustion air into a burner assembly to provide an atomized mixture and initially igniting the mixture to provide a flame wall proximate said burner assembly;

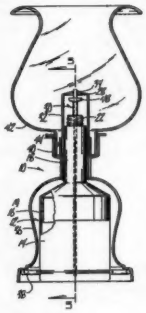
automatically throttling the initial introduction of said combustion air into said burner assembly only in instant response to preselectively high explosive start-up pressures within said burner assembly resulting from said initial ignition; and

introducing further combustion air in normally continuous, even flow into said burner assembly in accordance with exhaustion of said ignited gases from said burner assembly to provide a preselectively lower pressure within said burner assembly to maintain a normal steady state flame wall free of pulsations.

4,875,852
LAMP DEVICE

Robert C. Ferren, 602 Fifth Ave. South, Altoona, Iowa 50009

Filed Apr. 1, 1988, Ser. No. 176,721
Int. Cl.[4] F23D 3/18
U.S. Cl. 431—324 10 Claims



1. A lamp device comprising:

a fuel reservoir, said reservoir comprising a bottom cup means and a metal top, said cup means being of translucent plastic material and having a bottom, a continuous side wall, and an open top, said metal top closing said open top and extending upwardly therefrom and terminating in a reduced diameter portion;

a wick extending downwardly through said metal top into said fuel reservoir;

a shell means having an open top and bottom, and side wall removably secured to and surrounding said fuel reservoir so that said fuel reservoir may be removed through the bottom of said shell;

said bottom of said fuel reservoir being visually accessible whereby when said fuel reservoir is removed through the bottom of said shell, any fluid in said reservoir is visible through the bottom of said fuel reservoir.

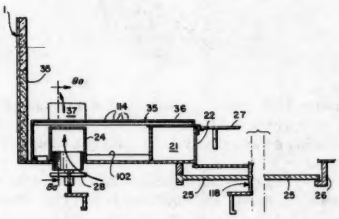
4,875,853
METHOD AND APPARATUS FOR CHARRING MATERIAL

Jacques Mage, 233 Rue Paul Doumer, 78510 Triel/Seine, France

Continuation of Ser. No. 850,234, Apr. 11, 1986, abandoned. This application Jan. 23, 1989, Ser. No. 300,703

Int. Cl.[4] F27D *1/08*

U.S. Cl. 432—100 **17 Claims**



1. An oven for charring material comprising:

(a) a container having a top and a bottom;

(b) a hearth for supporting the material to be charred spaced above said bottom;

(c) said bottom having means for discharging said charred material there through;

(d) said oven having means for admitting air through said bottom into the oven above said hearth through a path closed from space defined between said hearth and spaced bottom;

(e) means for permitting gases to flow from above said hearth to space defined between said hearth and said bottom separate from said means for admitting air;

(f) a means for exhausting gases from the space defined between said hearth and said bottom;

(g) a flue connected to the means for exhausting gases for directing said gases away from said oven.

4,875,854
MINIATURE FORGE

Leslie M. Emery, 1901 SW. Childs Rd., Lake Oswego, Oreg. 97034

Filed Mar. 22, 1988, Ser. No. 171,763

Int. Cl.[4] F24J *3/00*

U.S. Cl. 432—120 **7 Claims**

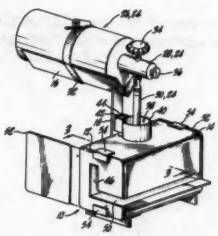
1. A miniature forge structure, small in size and light in weight so as to allow portability, comprising:

a forge body;

a fuel tank carriage securely mounted to a vertical bar which is slidably connected to said forge body;

a torch assembly secured to said fuel tank carriage, said torch assembly generating heat vertically downward into the interior of said forge body through a burner hole located in the top of said forge body;

an L-shaped cavity located within said forge body running from end to end which focuses the heat of the torch on a selected area of the object to be heated and shaped, said L-shaped cavity having edges curved inward in order to allow heat to reach the underside of the metal being heated;



a curved cavity contained within said forge body located directly below said burner hole.

4,875,855
TOOL

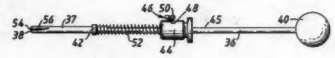
David Beckett, 27 Erleigh Road, Reading RG1 5LU, Berkshire, England

Filed Nov. 23, 1987, Ser. No. 123,888

Claims priority, application United Kingdom, Nov. 25, 1986, 8628091

Int. Cl.[4] A61G *7/00*

U.S. Cl. 433—3 **11 Claims**



1. A tool for manipulating a dental ligature to secure an archwire to a bracket on a tooth, said dental ligature having a loop portion and a pair of end portions extending away from said loop portion, said tool comprising:

a shaft having an end forming an abutment, the dental ligature being positionable, in use, with the loop portion thereof projecting around and beyond said end of the shaft for placement over the archwire and around the bracket;

a ligature carriage carried by the shaft and secured against rotation relative to said shaft, said carriage being freely longitudinally slidable along said shaft in at least one direction; and

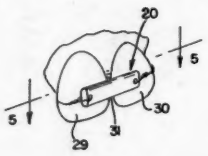
ligature mounting means on the carriage for receiving the end portions of the dental ligature when the ligature is positioned with the loop portion around and beyond said end of the shaft, said ligature mounting means securing the end portions of the dental ligature to the carriage against movement relative to the carriage;

the ligature carriage being initially longitudinally slidable along the shaft away from said end of the shaft to shorten the loop portion and draw said end of the shaft toward the archwire and bracket, said ligature carriage being thereafter drawn by the ligature toward said end of the shaft, upon subsequent rotation of the entire tool, by the shortening of the loop portion as the ligature is twisted to secure the archwire to the bracket.

4,875,856
ORTHODONTIC APPLIANCE FOR CLOSING SPACES AND CORRECTING MALOCCLUSION

Stephen M. Grussmark, 2901 S. Bayshore Dr., Coconut Grove, Fla. 33133

Continuation-in-part of Ser. No. 122,904, Nov. 19, 1987, abandoned. This application Aug. 23, 1988, Ser. No. 235,318
Int. Cl.[4] A61C 7/00
U.S. Cl. 433—18 23 Claims

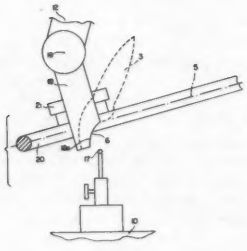


1. An orthodontic appliance for closing a space between two adjacent and substantially aligned teeth comprising, a bar of elastomeric material, and ligature wire means attached to said bar for securing the appliance to the teeth, said bar adapted to be disposed generally mesiodistally across the labial or buccal faces of the teeth and over the space therebetween, and said ligature wire means extending around the teeth and attached to opposite ends of said bar and being under tension to stretch said bar and produce a force to urge said teeth toward each other to close the space.

4,875,857
METHOD FOR RECONSTRUCTION OF TEETH IN AN UPPER JAW

Dietmar Kubein-Messenburg, Rodetal 36, 3406 Bovenden; Georg Meyer, Emilienstr. 11, 3400 Gottingen, and Wolfram Bücking, Buchweg 14, 7988 Wangen, all of Fed. Rep. of Germany

Continuation of Ser. No. 935,453, Nov. 26, 1986, abandoned. This application Aug. 1, 1988, Ser. No. 227,485
Claims priority, application Fed. Rep. of Germany, Nov. 29, 1985, 3542177
Int. Cl.[4] A61C 11/00
U.S. Cl. 433—56 31 Claims

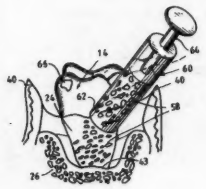


1. A method of reconstructing front teeth in an upper jaw, comprising in combination the steps of:
- mounting model impressions of the upper and lower jaw without at least one front tooth to be reconstructed in their natural condyles in an articulator;
- defining points of contact of the upper jaw front teeth with corresponding lower jaw front teeth in said model impressions;
- scanning an existing tool in the model impression of a jaw to obtain a protrusive contour curve of said existing tooth in a saggital plane thereof; and
- transferring said protrusive contour curve of the existing tooth to said at least one front tooth to be reconstructed in the saggital plane by a copying tool starting from said points of contact of the upper jaw front teeth with the corresponding lower jaw front teeth to form a palatal concavely curved surface of said front tooth to be reconstructed and model said front tooth.

4,875,858
METHOD AND COMPOSITION FOR DETECTING DENTIN

Steven R. Jefferies, Milford, and Chin-Teh Huang, Dover, both of Del., assignors to Dentsply Research & Development Corp., Milford, Del.

Filed Jul. 21, 1988, Ser. No. 222,686
Int. Cl.[4] A61C 5/00, 5/04
U.S. Cl. 433—226 6 Claims

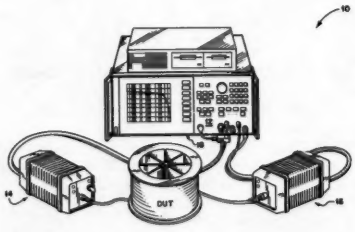


1. A method of repairing a tooth using a composite filling material, comprising the steps of:
- (a) preparing a tooth cavity for receiving a composite filling material;
- (b) applying a dentin stain to said tooth revealing the relative locations of dentin and enamel wherein said dentin stain stains said dentin while not affecting said enamel;
- (c) etching the enamel while avoiding contacting the stained dentin with etching composition;
- (d) removing the stain from the dentin using a bleaching agent; and
- (e) filling the cavity with composite filling material.

4,875,859
METHOD AND APPARATUS FOR GUIDING A USER DURING SETUP OF A SIGNAL MEASUREMENT SYSTEM

Roger W. Wong; Hugo Vifian, and Michael G. Hart, all of Santa Rosa, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 13, 1988, Ser. No. 143,775
Int. Cl.[4] G09B 7/00
U.S. Cl. 434—214 20 Claims



1. A method for guiding a user during initiation of a measurement on a device by a signal measurement system, comprising the steps of:
- providing a device physically connectable to the signal measurement system; and
- providing signal measurement system guided assistance to a user of the signal measurement system for at least one

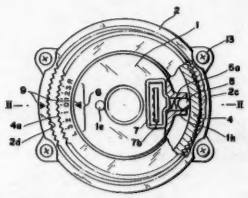
measurement, including instructions to the user for selecting the at least one measurement and instructing the user how to physically connect the device to the signal measurement system for performing the selected measurement.

4,875,860

ELECTRICAL CONNECTING APPARATUS FOR STEERING WHEEL AND STEERING COLUMN

Masaru Suzuki, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Nov. 3, 1988, Ser. No. 266,579
Claims priority, application Japan, Nov. 9, 1987, 62-170918[U]
Int. Cl.[4] H01R *35/04*
U.S. Cl. 439—15 5 Claims



1. In the apparatus for connecting wiring on a steering wheel to wiring on a steering column for use in an automotive vehicle, which includes a case assembly having a stationary casing fixed to the steering column and a rotor member rotatably disposed in said casing, said rotor member being rotatable together with the steering wheel, and a coil-shaped cable member accommodated in a space formed between said casings and said rotor member of said case assembly, wherein said cable member is made of a flexible material and is coiled to follow the movement of the steering wheel, one end of said cable member being fitted to said casing and the other end fitted to said rotor member, respectively, the improvement comprising:

an internal gear fixed to said casing concentrically with said rotor member;

a ring-shaped gear member having a plurality of gear teeth on its outer periphery, the number of teeth being at least one tooth less than that of said internal gear and which are engaged with said internal gear, said ring-shaped gear member being movably arranged inside said internal gear and free from said casing and said rotor member;

bias means for biasing said ring-shaped gear member against said internal gear so that said gear member may engage said internal gear, said bias means being fitted to said rotor member; and

indication means arranged on a surface of said ring-shaped gear member for cooperating with a mating mark which is provided for on at least one of said casing and said rotor member.

4,875,861

MASS INTERCONNECT SYSTEM

Roy E. Pennington, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 44,084, Apr. 29, 1987, Pat. No. 4,804,335.
This application Nov. 9, 1988, Ser. No. 269,277
Int. Cl.[4] H01R *9/09, 13/64*
U.S. Cl. 439—79 8 Claims

1. An interconnect module for supporting at least one terminal block of the type including a bank of electrical connectors and a plurality of electrical conductors secured to said electrical connectors, wherein said interconnect module is adapted to interface said bank of electrical connectors with electrical leads on a printed circuit card positioned at the opening of a mainframe card cage; wherein said interconnect module comprises:

(a) a frame member including a front face, said frame member being adapted to support said terminal block in a manner such that said bank of electrical connectors is accessible at said front face of said frame; and

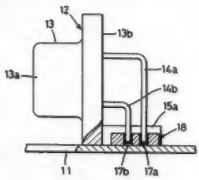
(b) retention means carried by said frame for retaining said terminal block in said frame; wherein said front face includes a plurality of apertures; wherein said nodule further comprises latch means associated with said apertures; wherein said latch means is adapted to releasably engage support members carried by a frame assembly on said mainframe card cage when said support members are inserted into said apertures.

4,875,862

SURFACE MOUNTABLE CONNECTOR

Yukio Sakamoto; Takeshi Tanabe; Iwao Fukutani, and Toshio Hori, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Continuation-in-part of Ser. No. 242,417, Sep. 9, 1988, abandoned. This application Dec. 21, 1988, Ser. No. 287,085
Claims priority, application Japan, Sep. 9, 1987, 62-137971; Dec. 21, 1987, 62-194182; Dec. 21, 1987, 62-194183
Int. Cl.[4] H01B *9/09*
U.S. Cl. 439—79 10 Claims



1. A surface mountable connector comprising:

a connector housing;

a plurality of connector pins projecting from the rear surface of said connector housing; and

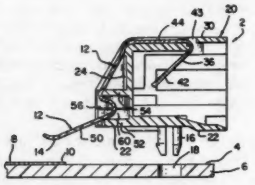
a connector pin holder having a plurality of through holes therein through which said connector pins are inserted on one face thereof, and being spaced the same as the pitch of said connector pins, and having on at least the outer surface thereof a plurality of conductive patterns corresponding to said through holes respectively and extending from said through holes to the opposite face of said connector pin holder, the tips of said connector pins in said through holes being in electrical connection with the respective conductive patterns.

4,875,863

ELECTRICAL DEVICE HAVING IMPROVED LEADS FOR SURFACE MOUNTING ON A CIRCUIT BOARD

Carl G. Reed, Clemmons, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 11, 1988, Ser. No. 179,697
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—79 22 Claims



1. An electrical device which is intended to be surface mounted on a circuit board surface, the device comprising an insulating body having a mounting surface which is opposed to, and proximate to, the circuit board surface when the device is mounted on the circuit board surface, a side surface which extends transversely of the mounting surface, and a plurality of spaced apart leads which extend from the side surface, each of the leads having an adjacent portion which is adjacent to the side surface and an end portion which extends away from the side surface, the end portions having contact portions which are connected to circuit board conductors when the device is mounted on the circuit board surface, the device being characterized in that:

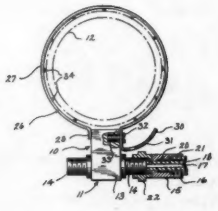
the side surface has locating stop portions and each lead has a lead locating portion which adjoins its end portion, the lead locating portions being resiliently biased against the locating stop portions when in the unconnected condition of the device, whereby, the lead locating portions are coplanar by virtue of their being against the locating stop portions, and the end portions are maintained in coplanar aligned relationship by the lead locating portions.

4,875,864

GROUND CLAMP FOR COAXIAL CABLE JUNCTION BLOCK

Marvin J. Campbell, 4904 W. Vliet St., Milwaukee, Wis. 53208

Filed Mar. 13, 1989, Ser. No. 322,613
Int. Cl.[4] H01R 4/66, 17/04
U.S. Cl. 439—100 9 Claims



1. An assembly for mounting, interconnecting, and grounding a pair of terminated coaxial cable sections to a tubular grounding member comprising:

a coaxial cable junction block including a pair of connectors adapted to receive and electromechanically interconnect the terminated ends of the coaxial cable sections;

adjustable strap means attached to the junction block and adapted to substantially encircle the grounding member for clamping the block thereto;

said adjustable strap means including one end portion fixedly attached to the junction block and another end portion adjustable with respect to the fixed end and the junction block; and,

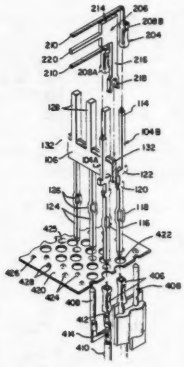
threaded fastening means for adjustably connecting the ends of the strap means to effect the clamping of the assembly to the tubular grounding member.

4,875,865

COAXIAL PRINTED CIRCUIT BOARD CONNECTOR

Henry W. Demler, Jr., Lebanon, Pa.; Frank P. Dola, Hudson, Fla.; David J. Kimmel, Clearwater, Fla., and Thomas J. Sotolongo, Clearwater Beach, Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 15, 1988, Ser. No. 220,141
Int. Cl.[4] H01R 4/66
U.S. Cl. 439—101 18 Claims



13. An electrical connector for interconnecting a plurality of electrical contacts, the connector comprising a conductive plate having a plurality of apertures, each said aperture having means for engaging a single contact, said engaging means comprising tabs having edges defined by slits, the tabs deflecting when said contacts are inserted therein, wherein said tabs of different said apertures extend from opposite sides of the said conductive plate, contacts being insertable into the said plate apertures from opposite sides.

4,875,866

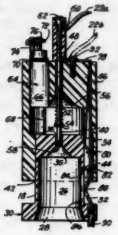
LIGHT BULB SOCKET

Arnold F. Winant, 87 Susquehanna Ave., Great Neck, N.Y. 11021

Filed Aug. 29, 1988, Ser. No. 237,130
Int. Cl.[4] H01R 13/44
U.S. Cl. 439—140 7 Claims

1. An improved light socket for use with light bulbs having a base including a first, central electrical contact and a mounting thread forming a second electrical contact, said socket comprising a frame and a cup adapted to accept the bulb base mounted for longitudinal motion within said frame between a first extended position and a second retracted position, first means operatively joined to said cup for establishing electrical contact with the bulb and second means operatively joined to said cup for retaining said bulb in said cup, said first and second means being engaged with said bulb when said cup is in the second retracted position and disengaged from said bulb when said cup is in the first, extended position, wherein said first means comprise first and second electrical contacts mounted to said frame, said first electrical contact extending coaxial with the direction of cup travel through an aperture in the bottom of said cup, said first contact projecting through the bottom of

said cup for contact with said central contact of the bulb when said cup is in the retracted position, said second electrical



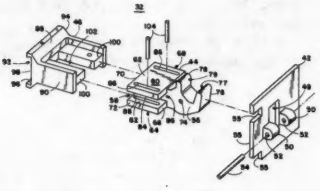
contact projecting through the side of said cup when said cup is in the retracted position for contact with the mounting thread contact of the bulb.

4,875,867

EXTENSION HANDLE FOR A CIRCUIT BOARD INJECTOR/EJECTOR MECHANISM

Kee K. Hoo, Vancouver, Wash., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jan. 26, 1989, Ser. No. 302,841
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—157 **18 Claims**



1. An injector/ejector mechanism for urging a circuit board plug-in module into and out of a card cage mainframe comprising:

a first handle segment rotatably connected to a front panel of the plug-in module, the first handle segment having a bearing end and a passage formed within the segment and extending outwardly from the front panel opposite the bearing end; and

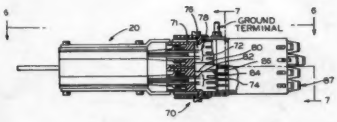
a second handle segment having a gripping member normal to an extension member, the extension member slidably mating with the passage in the first handle segment, the second handle segment movable with respect to the first handle segment from a first position wherein the extension member is within the passage to a second position wherein a portion of the extension member is exposed outside the passage providing additional mechanical advantage at the bearing end when pressure is applied to the gripping member for urging the circuit board module into and out of the mainframe during rotation of the injector/ejector mechanism.

4,875,868

ELECTRICALLY PROTECTED CONNECTOR FOR TELEPHONE DISTRIBUTION FRAMES

Casimir Z. Cwirzen, Arlington Heights, and Albert Kupferschmidt, Highland Park, both of Ill., assignors to Northern Telecom Limited, Canada

Filed Aug. 5, 1988, Ser. No. 229,124
Int. Cl.[4] H01R *29/00*
U.S. Cl. 439—188 **19 Claims**



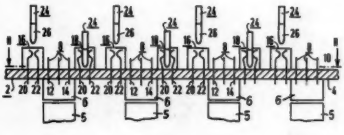
1. A protection system for a telephone distribution frame for interconnecting inside and outside lines and having at least one set of contacts individually associated with each line connected thereto, said system comprising an interface module means which may be connected to said set of contacts, said module including contacts with a geometry which is selected to complete a desired make/break sequence of circuit connections when said module is plugged into or removed from said set of contacts, means on said module for receiving a further module containing electronic circuitry protecting equipment, means within said distribution frame for connecting said further module to said line, and means within said module for continuously applying ground to outside lines while enabling an isolation of inside lines from said outside lines.

4,875,869

BACKPLANE WITH ASSOCIATED HANDLING MEANS

Johannes Bruen, Erlangen, and Hans-Peter Latussek, Feucht, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 18, 1988, Ser. No. 170,146
Claims priority, application Fed. Rep. of Germany, Mar. 20, 1987, 3709113
Int. Cl.[4] H01R *9/22, 13/70*
U.S. Cl. 439—189 **5 Claims**



1. A backplane for a subrack having modules, comprising:

a least one bus having at least one bus line;

a plurality of socket connectors arranged in parallel next to each other on a side of the backplane facing the modules, each socket connector having at least one bus contact pin;

a spring contact for each bus contact pin of each socket connector of said at least one bus disposed on a side of the backplane that faces away from the modules, each spring contact having first and second resilient contact pins, said first contact pin of each spring contact being adjacent the bus contact pin of each socket connector and electrically connectable to a corresponding contact pin, said second contact pin of each spring contact being electrically connected with said at least one contact bus line; and

handling means for controlling the electrical connection of said first and second spring contact connections of each spring contact.

4,875,870

ARTICLE FOR PROTECTING A SUBSTRATE

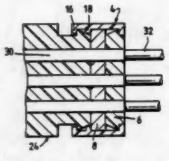
Judy Hardy, Swindon, England, and Kenneth Wallington, Cirencester, United Kingdom, assignors to Raychem Limited, Swindon, England

Filed Jul. 18, 1988, Ser. No. 220,184

Claims priority, application United Kingdom, Jul. 16, 1987, 8716814; Sep. 23, 1987, 8722434

Int. Cl.[4] H01R 4/60

U.S. Cl. 439—204 17 Claims



1. An article for protecting a multiconductor connector having a plurality of contacts holes therein for receiving a plurality of contact pins, the article comprising:

(a) an open container having a base and sides and;

(b) within the container a continuous layer of gel having a cone penetration value within the range of from 30 to 400 (10^{-1} mm), wherein:

the sides of the open container can be secured in use in first and second positions relative to the multiconductor connector and the base of the open container is adjacent to the gel layer and allows passage of said contact pins and trailing wires therethrough but substantially prevents egress of the gel from the container, wherein at least when the container is secured in the said second position relative to the container the gel is compressed.

4,875,871

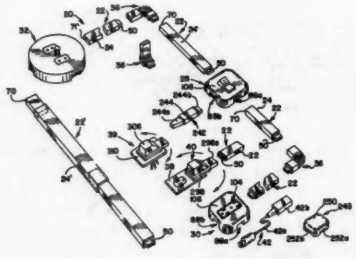
MODULAR ELECTRICAL CONDUCTOR SYSTEM

Donald J. Booty, Sr., Frankfort, Ill., and Donald J. Booty, Jr., Munster, Ind., assignors to National Service Industries, Inc., Atlanta, Ga.

Filed Nov. 9, 1904, Ser. No. 670,322

Int. Cl.[4] H01R 25/00

U.S. Cl. 439—209 31 Claims



1. A modular electrical conductor system for electric circuit wiring, comprising:

at least one elongated substantially closed modular carrier member having opposite ends and a plurality of electrical conductors extending longitudinally therethrough,

a male end connector affixed to one end of said carrier member and defining a plurality of shielded male conductor contacts selectively electrically connected to said electrical conductors within said carrier member,

a female end connector affixed to the other end of said carrier member and defining a pluraltiy of shielded female conductor contacts selectively electrically connected to said electrical conductors within said carrier member, said male and female end connectors being adapted for mating cooperation with similar female and male connectors, respectively,

at least one modular electrical element which includes a modular low profile base housing having a generally polygonal plan configuration defining a plurality of side surfaces, said modular housing defining at least one male connector site at a selected one of said side surfaces and having a plurality of shielded male conductor contacts adapted for electrical plug-in connection with a female end connector on said carrier member, and defining at least one female connector site at another of said side surfaces and having a plurality of shielded female conductor contacts adapted for electrical plug-in connection with a male end connector on said carrier member, and a plurality of electrical conductors supported by said base housing so as to terminate at said connector sites, and

a low profile cover member adapted to be releasably mounted on said base housing and having side walls adapted to overlie said side surfaces of said base housing, each of said side walls having a recess formed therein enabling access to the corresponding connector site, whereby one or more of said carrier members may be selectively electrically connected in plug-in fashion to each other and to one or more of said modular elements to establish an electric circuit.

4,875,872

TELEPHONE CONNECTOR

Masanori Tanaka, Osaka, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Oct. 26, 1988, Ser. No. 262,643

Claims priority, application Japan, Nov. 4, 1987, 62-169112[U]

Int. Cl.[4] H01R 4/50

U.S. Cl. 439—344 7 Claims

1. A telephone connector comprising:

a connector body fabricated of a resinous material and having terminal housing holes formed therein, said connector body having a pair of opposite side surfaces and front and back surfaces, said side surfaces respectively having side grooves therein extending in a front-to-back direction of said connector body;

terminals housed in said terminal housing holes, each of said terminals having a resilient contact portion at one end thereof; and

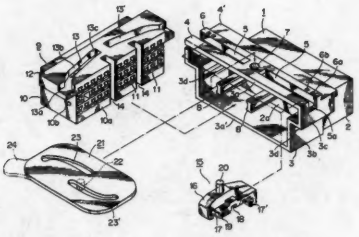
a substantially U-shaped metal cover having a pair of spaced opposite sides which respectively include inwardly extending marginal portions that are fitted into said side grooves of said connector body, whereby said U-shaped metal cover defines three sides of a plug receiving hole and the fourth side of said plug receiving hole is defined by said connector body, said spaced opposite sides of said U-shaped metal cover also having stoppers extending inwardly at the rear end of said metal cover into abutment with said back surface of said connector body, and the front end of said metal cover further having engaging pieces extending respectively from said spaced opposite sides of said U-shaped metal cover into engagement with said front surface of said connector body.

4,875,873

MULTI-TERMINAL CONNECTOR

Shigeo Ishizuka, and Katsutoshi Kuzuno, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Dec. 7, 1988, Ser. No. 280,805
Claims priority, application Japan, Dec. 9, 1987, 62-309386
Int. Cl.[4] H01R *4/50*
U.S. Cl. 439—347 8 Claims



1. A multi-terminal connector comprising:
a female housing having a plurality of male terminals stored therein;
a male housing having a plurality of female terminals stored therein;
a plurality of guide rails, at least two of which are connected to each other by a connecting portion provided with an axis hole at a center portion thereof on a longer side edge wall of an enlarged body portion of said female housing, said guide rails intersecting at right angles to the axes of said male terminals;
a pair of sliders with each slider slidably engageable with said guide rails and having a pin projecting upwardly from a top surface and a cam follower projecting downwardly from a lower portion thereof;
a pair of longitudinally aligned slots formed between said at least two guide rails with said connected center portion for permitting each of said cam followers to extend therethrough;
a pair of cam tracks arranged in an outer surface of said male housing and symmetrically extending rearward in a diagonal direction from the lateral ends thereof to receive said respective cam followers extending through said slots; and
a rotary actuator plate provided with two symmetrical grooves provided around a pin projecting downwardly from a center portion thereof and adapted to be attached to said rail connecting portion by insertion of said pin through said axis hole.

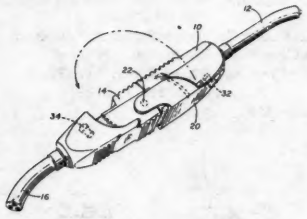
4,875,874

ELECTRICAL CONNECTOR SECURING ARRANGEMENT

John F. Windsor, Jr., 4501 Raymar Dr., Orlando, Fla. 32809

Filed Nov. 3, 1988, Ser. No. 266,826
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—364 10 Claims

1. An electrical connector securing arrangement for use upon the female socket of an extension cord, to prevent the unintentional separation from the socket of a male plug that has been interfitted therewith, said electrical connector securing arrangement comprising a socket having thereon a pivotally mounted rotatable latch member, rotatable between extreme positions that are more than 180 degrees apart, and a specially configured compatible male plug utilized with said socket, said rotatable latch member having a raised and shaped central locking portion able to releasably engage a portion of said plug when said rotatable latch member is in an extended position of its rotation, and thus effectively prevent undesired separation of said socket and plug when interfitted, said central locking portion of said rotatable latch member having the ability to be towed unobtrusively on a certain recessed and shielded part of the body of said socket when said socket and said plug have been separated, and said rotatable latch member has been



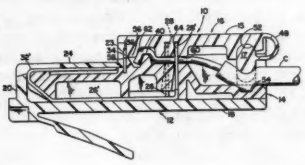
moved to an extreme or retracted position of its rotation, the stowing of said rotatable latch member in said recessed and shielded location on said socket serving to prevent same from becoming snagged on a nearby object.

4,875,875

FIELD TERMINABLE MODULAR CONNECTOR

Lee A. Archer, Asheville, and Kenneth W. Brownell, Jr., Marion, both of N.C., assignors to Brintec Corporation, Williamantic, Conn.

Filed Sep. 28, 1987, Ser. No. 101,570
Int. Cl.[4] H01R *4/24*
U.S. Cl. 439—401 24 Claims



1. A field terminable modular connector for terminating an electrical cable having a plurality of insulated electrical conductors and comprising an assembly of connector sections, a plurality of insulation displacement contacts supported by one of said connector sections, stuffing means for setting each of said insulated electrical conductors of a cable to be terminated in insulationed displacing engagement with an associated one of said insulation displacement contacts in response to movement of another of said connector sections into assembled relation with said one connector section, shearing means for trimming free and portions of the insulated conductors in response to movement of said other connector section into assembled relation to said one connector section and including a shearing blade mounted on one of said conductor sections, reflecting means for kinking the trimmed free end portions of said insulated electrical conductors o move the trimmed free ends thereof away from said shearing blade and for gripping and holding the trimmed free end portions of the insulated electrical conductors in spaced relation to said shearing blade and in fixed position relative to said modular connector in response to movement of said other connector section into assembled relation to said one connector section, and cable strain relief means for gripping and holding an associated portion of the electrical cable in fixed position relative to an associated one of said connector sections before said other connector section is moved into assembled relation to said one connector section and including a strain relief member and means for effective snap-together assembly between said strain

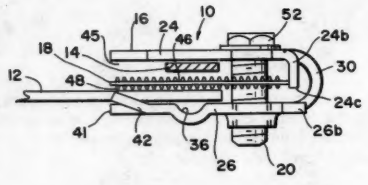
relief member and said associated one of said connector sections.

4,875,876

ELECTRICAL CONNECTOR FOR OVERLAPPED CONDUCTORS

Francis A. O'Loughlin, Scotch Plains, N.J., assignor to Thomas & Betts Corporation, Bridgewater, N.J.

Filed Aug. 31, 1988, Ser. No. 239,107
Int. Cl.[4] H01R *4/38*
U.S. Cl. 439—431 **12 Claims**



1. An electrical connector for connecting a pair of conductors, comprising:

a connector body including:

a first conductive planar member, a second conductive planar member and a deformable hinge which is narrow relative to the width of said planar members and which connects said first and second planar members and places said planar members in a substantially parallel relationship, said first and second planar members defining therebetween a passageway for accommodating said conductors in transverse overlapped relationship; and

progressive urging means for progressively urging said first and second planar members toward one another for placing said overlapped conductors in electrical engagement, said hinge being deformable in a direction away from said passageway upon said urging of said first and second planar members to maintain said first and second planar members in a mutually parallel relationship.

4,875,877

DISCRETE CABLE ASSEMBLY

David S. Fleak, Palmyra; Keith S. Koegel, Harrisburg; William B. Long, Camp Hill; Stanford C. Moist, Jr., Hummelstown, and Warren D. Nauman, Elizabethtown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 12, 1988, Ser. No. 243,385
Int. Cl.[4] H01R *9/07*
U.S. Cl. 439—497 **18 Claims**

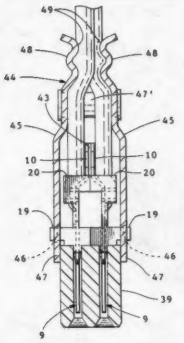
1. An electrical connector for connection to ground wires and signal wires of at least one corresponding cable comprising; conductive signal contacts having wire connecting portions for connection to corresponding signal wires, and wire connecting portions of a corresponding ground bus for connection to corresponding ground wires, wherein the improvement comprises;

a unitary lead frame joins the ground bus and the signal contacts prior to selected ones of the signal contacts being detached from the ground bus,

an insulative housing block assembled over the lead frame prior to selected ones of the single contacts being detached from the ground bus,

the wire connecting portions appear at first openings in the housing block, and

means on the lead frame appear at additional openings in the housing block for detaching the signal contacts individually from the ground bus, whereby the selected ones of the signal contacts contacts are constructed for being de-



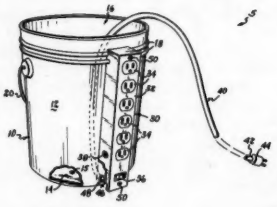
tached from the ground bus and at least one signal contact is constructed to remain joined to the ground bus.

4,875,878

EXTENSION CORD/TOOL CARRIER

Robert R. Meyer, Cincinnati, Ohio, assignor to Meyer Flooring Inc., Cincinnati, Ohio

Filed Nov. 16, 1988, Ser. No. 272,221
Int. Cl.[4] H01R *13/73*
U.S. Cl. 439—501 **10 Claims**



1. An extension cord/tool carrier comprising:

a bucket having a vertical sidewall to define a cavity adapted to receive a length of electrical cord and a plurality of hand tools therein through an open top formed at one end of the bucket cavity;

a row of electrical plug receptacles fixedly mounted to the sidewall of the cavity;

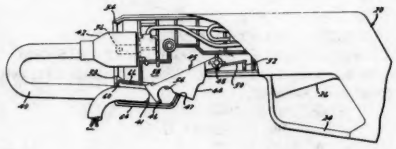
a length of electrical cord receivable within the bucket cavity, the cord being electrically coupled at a first end to the receptacles and at a second end to a plug member whereby the bucket provides a container for transporting the cord therein, the receptacles thereon and selected tools which a user places therein through the open top and whereby the plug member and a length of the cord may be selectively removed from the bucket through the open top for connection to a source of electrical supply so as to provide power at the receptacles.

4,875,879

CORD RETAINER FOR A PORTABLE ELECTRIC TOOL

Roderick F. Bunyea, Westminster, and Donald W. Zarwelle, Lutherville, both of Md., assignors to Black & Decker Inc., Newark, Del.

Filed May 11, 1988, Ser. No. 193,028
Int. Cl.[4] H01R *13/72*
U.S. Cl. 439—501 68 Claims



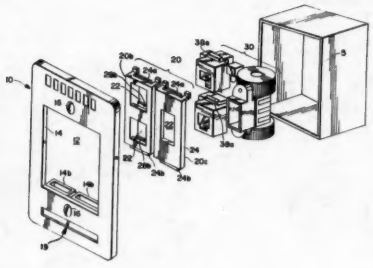
1. A portable electric power tool comprising a motor, electrical connector means electrically connected to the motor and adapted for electrical connection to one end of a power cord, a housing having a first opening which communicates with a cavity formed in said housing that is adapted to receive a loop of said cord when inserted through said first opening, and a cord retaining member mounted within said cavity and movable between a first position wherein a portion of said retaining member is positioned between the apex of said loop of cord and said first opening whereby said cord is secured against withdrawal from said housing, and a second position wherein said portion of said cord retaining member is removed from between the apex of said loop of cord and said first opening thereby permitting said loop of cord to be withdrawn from said housing.

4,875,880

MODULAR FACEPLATE SYSTEM

Glenn S. Welch, Lynnfield; Stephen Fidrych, Boxboro; Michael Romm, Brighton, and Bernie J. Maurer, Melrose, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 21, 1988, Ser. No. 222,500
Int. Cl.[4] H01R *13/60*
U.S. Cl. 439—536 16 Claims



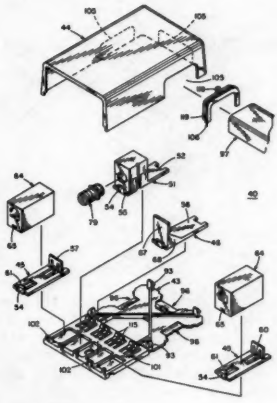
1. A modular faceplate system comprising:
a faceplate having an elongated primary frame opening formed therein;
a plurality of secondary support members interchangeably mounted on said faceplate in said primary frame opening, at least one of said secondary support members having at least one secondary frame opening formed therein;
a plurality of modules, one of said modules supported in each said secondary frame opening and at least one module supporting an electrical device.

4,875,881

COMMUNICATION BOX ASSEMBLY

Jack E. Caveny, Hinsdale; John J. Bulanda, New Lenox; Richard L. Fischer, Lisle; Andrew J. Stroede, Tinley Park, and Donald C. Wiencek, Tinley Park, all of Ill., assignors to Pandult Corp., Tinley Park, Ill.

Filed Apr. 8, 1988, Ser. No. 179,157
Int. Cl.[4] H01R *13/73*
U.S. Cl. 439—535 15 Claims



9. A communication box assembly, comprising:
a base;
at least one connector; and
a connector mounting means formed in the surface of the base for mounting the connector in one of a plurality of identical juxtaposed connector mounting positions such that a first operative end of the connector is positioned adjacent an outer edge of the base for connection with office service cables and a second operative end of the connector is presented inwardly for connection within the assembly to a central system service cable, the connector mounting means including a plurality of independently releasable connector latches disposed opposite to and in direct correspondence with a plurality of connector trapping lugs, wherein the connector includes positioning means formed in an edge of the connector for engaging corresponding adjacent connector trapping lugs on the base and for centering the connector with respect to the lugs, and a latch slot in an edge opposite the positioning means, the latch slot shaped to engage a corresponding latch and center the connector with respect to the latch.

4,875,882

SPLASH GUARD FOR OUTBOARD MOTOR

Cheryl A. Plitt, 3075 Hwy. F, Redgranite, Wis. 54970, and James C. Dutcher, 5085 Burr Oak Rd., Oshkosh, Wis. 54904

Filed Aug. 30, 1988, Ser. No. 238,753
Int. Cl.[4] B63H *1/18*
U.S. Cl. 440—66 19 Claims

1. In a marine drive having a propulsion assembly including an upper unit housing an engine, a lower unit including a gearcase carrying a propeller, said gearcase includes an anti-ventilation plate above said propeller and a spray plate spaced above said anti-ventilation plate, and a drive shaft housing mounted between the gearcase and upper unit and carrying a drive shaft for drivingly interconnecting the engine and propeller, and a transom bracket assembly positioned forwardly of said propulsion assembly for supporting the propulsion assembly from a transom of a boat, a splash guard for diverting water

away from the propulsion and bracket assemblies during operation of the boat, comprising:

a substantially U-shaped deflector member mounted between said anti-ventilation plate and said spray plate, said deflector member having a head portion and a body portion extending rearwardly of said head portion, said head portion including a leading edge spaced forwardly of said

gearcase and a trailing edge disposed adjacent said gearcase, and said body portion including a pair of rearwardly extending spaced apart fin members disposed on opposite sides of said gearcase each fin member having an inner edge disposed adjacent said gearcase and an outer edge spaced outwardly of said gearcase; and

mounting means for removably mounting said deflector member on said gearcase.

4,875,883

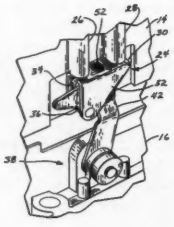
LATCH ASSEMBLY FOR RELEASABLY SECURING COWL SECTIONS OF AN OUTBOARD MOTOR

Gordon C. Slattery, Omro, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jul. 14, 1988, Ser. No. 219,081

Int. Cl.[4] B63H *21/26*

U.S. Cl. 440—77 **12 Claims**



1. For an outboard motor or the like having a power head enclosed by first and second cowl sections, wherein a compressible seal is provided at a joint formed between said first and second cowl sections, a latch assembly for releasably securing said first and second cowl sections together, comprising:

catch means connected to one of said cowl sections;

latch means movably connected to the other of said cowl sections, said latch means being movable between an engaging position in which said latch means engages said catch means for securing said cowl sections together during normal operation and providing compression to said compressible seal and a disengaging position in which said latch means and said catch means are disengaged, wherein further compression of said compressible seal when said latch means is in its engaging position causes movement of said latch means out of engagement with said catch means so as to be movable toward its disengaging position; and

retainer means for engaging said latch means during movement of said latch means out of engagement with said catch means when said latch means is in its engaging position, so as to prevent said latch means from moving to its disengaging position.

4,875,884

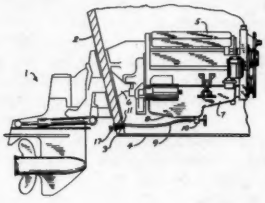
MARINE PROPULSION DEVICE WITH THRU-TRANSOM ENGINE OIL DRAIN SYSTEM

Gary L. Meisenburg, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Nov. 23, 1988, Ser. No. 276,378

Int. Cl.[4] B63H *21/38*

U.S. Cl. 440—88 **4 Claims**



1. In a marine propulsion device, the combination comprising:

(a) a boat (3) having a transom (2) at its stern end,

(b) a marine internal combustion engine (5) disposed inboard of said boat,

(c) an oil pan (7) mounted to said engine,

(d) and means (9–11) for draining oil by gravity from said oil pan and through said transom to the exterior of said boat.

4,875,885

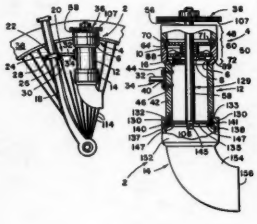
ENGINE NOISE SIMULATING DEVICE FOR A BICYCLE

Horton Johnson, 186 Hazel Ave., Highland Park, Ill. 60035

Filed Oct. 15, 1987, Ser. No. 108,687

Int. Cl.[4] A63H *5/00*; B60Q *5/00*

U.S. Cl. 446—189 **24 Claims**



1. A noisemaker for bicycles and the like comprising:

a housing including a shoulder;

a resonator plate seated in said housing on said shoulder;

spring means for resiliently biasing said plate against said shoulder;

a resonator chamber extending from said shoulder, away from said housing;

drive and cam means for periodically raising said plate above said shoulder against the resilient bias of said spring means and for releasing said plate for movement back into

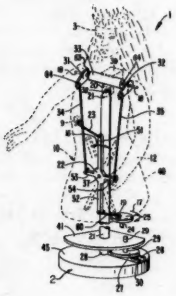
contact with said shoulder, whereby a surface-engaging noise and air compression noise are directed into said resonator chamber to simulate the sound commonly associated with a vehicle engine, said drive and cam means including a drive shaft rotatably mounted on said housing, a drive wheel fixed to said shaft, and a cam fixed to said shaft and engagable with said plate upon rotation of said shaft.

4,875,886

HULA DOLL HAVING COMPOUND MOTIONS

Rak M. Sung, 225 Kaiulani Ave., Apartment 505, Honolulu, Hi. 96815

Filed Sep. 20, 1988, Ser. No. 246,691
Int. Cl.[4] A63H *13/04, 3/28*
U.S. Cl. 446—298 **12 Claims**



1. A hula doll, comprising:

a base;

a support column which is rotatably connected to and supported by said base;

a doll body pivotably connected to said support column, said doll body including a pair of arms which are rotatably connected to said doll body;

means for pivotably moving said doll body about a pivot which is supported by said support column, said means for pivotably moving said doll body about said pivot including a linkage arm and means for moving one end of said linkage arm in a generally reciprocatory motion, said linkage arm having another end connected to said body;

means for rotating said support column relative to said base; and

means for pivoting said arms relative to said doll body.

4,875,887

MOBILE TOY

Giuseppe Maestri, 19 Leighton Ave., Clinton, Mass. 01510

Filed Jul. 20, 1988, Ser. No. 221,675
Int. Cl.[4] A63H *11/00*
U.S. Cl. 446—314 **5 Claims**

1. A toy comprising:

(a) a supporting base which is adapted to rest on a horizontal surface,

(b) an inclined ramp which is mounted on said supporting base, said ramp having a continuous zig-zag slot which extends along an axis which is at an angle to the horizontal when said supporting base rests on a horizontal surface, said slot constituting first and second alternating short portions, each of said first portions extending downwardly at an angle to said axis toward one side of said axis and each of said second short portions extending downwardly at an angle to said axis toward the opposite side of said axis, and

(c) a figure which comprises:

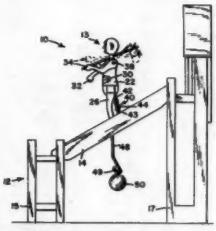
(1) a body having a longitudinal axis which is normally vertical,

(2) a pair of spaced legs which are mounted to said body and which extend downwardly from said body to said ramp on opposite sides of said slot,

(3) a tail which is fixed to said body and which extends downwardly and rearwardly from the body into said slot,

(4) an appendage which is fixed to said body and which extends downwardly from the body between said legs to said slot, said appendage having a lower free end,

(5) an elongated connector which extends through said slot, said connector having an upper end which is connected to the lower end of said appendage, and a lower end which extends below said slot, and



(6) a counterweight which is attached to the lower end of said connector so that said counterweight and said connector form a pendulum having a focal point at the lower free end of said appendage, wherein the swinging of said pendulum in a vertical plane which is transverse to a horizontal axis which is vertically aligned with the axis of said slot causes said body to oscillate from side to side within said plane while said tail moves progressively from one short portion said slot to the next lower short portion said slot, thereby causing said body to partially rotate about its longitudinal axis in one direction and then in the opposite direction for each oscillation of said body, thereby advancing each of said legs alternately forwardly down said ramp to enable said figure to advance progressively down said ramp.

4,875,888

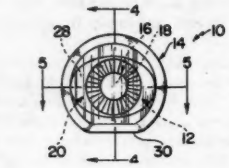
EYE CONSTRUCTION FOR TOY DOLL

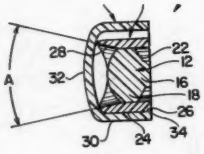
Thomas J. Harvey, 64 Floral Park Blvd., Pawtucket, R.I. 02861

Filed Sep. 23, 1988, Ser. No. 249,419
Int. Cl.[4] A63H *3/38*
U.S. Cl. 446—392 **7 Claims**

1. An eye construction comprising means simulating substantially circular concentric pupil and iris portions of an eye; a white portion encircling said iris portion, said white portion including a concave white portion surface which extends forwardly from the perimeter of said iris portion, opposite portions of said white portion surface diverging in their outward extents, the opposite side portions of said white portion surface diverging at greater angles than the opposite top and bottom portions of said white portion surface; and a rounded dome-shaped, transparent cover portion on said white portion covering the forwardly facing portions of said white portion,

said iris portion and said pupil portion, said cover being spaced forwardly from said iris portion and said pupil portion, and an





annular portion extending from the perimeter of said dome-shaped portion surrounding said white portion.

4,875,889

COMBINE CROP MATERIAL FLOW ADJUSTMENT SYSTEM

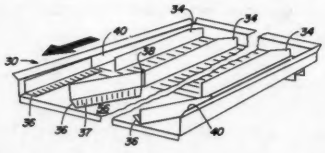
Paul Hagerer; Fritz Glaser; Josef W. Klimmer, and Reinhard Kunze, all of Zweibrucken, Fed. Rep. of Germany, assignors to Deere & Company, Moline, Ill.

Filed Oct. 5, 1988, Ser. No. 253,834

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 3733619

Int. Cl.[4] A01F *12/00, 12/46*

U.S. Cl. 460—1 **6 Claims**



1. In a combine having a main separator body with opposite lateral side walls, a threshing and separating means mounted within the combine between the opposite side walls, and a generally horizontal conveyor means adapted to receive crop material from the threshing and separating means and deliver it to a cleaning means that separates grain from other crop material, the conveyor means including a generally horizontal grain pan having opposite sides adjacent the opposite side walls of the combine and a generally horizontal grain pan floor extending between the opposite sides of the grain pan, the improvement comprising:

a plurality of generally upright, fore-and-aft extending adjustable guide vanes pivotally connected to the grain pan floor and adjustable between first and second positions wherein they deflect crop material on the conveyor means toward one or the other of the opposite sides of the combine;

adjusting means connected to the adjustable vanes for swinging the vanes between their first and second positions in response to shifting of the adjusting means between first and second positions and including a generally horizontal, transverse member mounted below the grain pan floor for lateral adjustment relative thereto, and vertical pins extending upwardly from the transverse member through the floor and connected to the vanes;

electrically actuated motor means operatively connected to the adjusting means for shifting the adjusting means between its first and second positions in reponse to actuation of the motor means;

a pair of sensing means respectively mounted on the combine adjacent the opposite sides of the combine body and operative to generate an electric signal in response to a parameter of the crop material adjacent the respective side of the combine; and

control means responsive to the signals from the sensor means for controlling the supply of electric power to the motor means, so that the motor means shifts the adjusting member and the adjustable vanes attached thereto between their opposite positions to deflect crop material toward one side of the combine or the other in response to a difference in the signals generated by the sensing means.

4,875,890

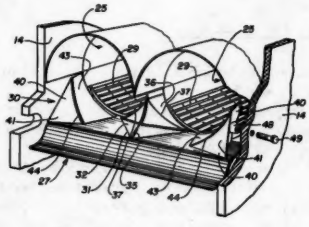
FEED PLATE ASSEMBLY FOR AXIAL FLOW COMBINE

Edwin O. Margerum, Paradise, Pa., and Russell W. Strong, Brugge, Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Feb. 29, 1988, Ser. No. 161,525

Int. Cl.[4] A01F *7/06*

U.S. Cl. 460—68 **7 Claims**



1. In a combine harvester having a frame; a pair of longitudinally extending axial flow threshing and separating rotors rotatably supported on said frame each said rotor including a forward auger section and a rearward threshing and separating section; an elevator pivotally mounted on said frame forwardly of said rotors and operable to deliver crop material to said auger sections of said rotors for subsequent conveyance thereof to the respective said threshing and separating sections; and a feed plate supported on said frame between said elevator and said rotors to direct the flow of crop material from said elevator to said auger sections of said rotors, an improved feed plate comprising:

a divider member positioned between said rotors, said divider member having a first surface adjacent said elevator and extending therefrom upwardly and rearwardly toward said rotors and a longitudinally extending dividing line at the transverse center of said divider member to symmetrically divide said first surface such that said first surface slopes inwardly toward the corresponding said rotor from said dividing line, said first surface joining a first arcuate surface concentric with the axis of rotation of each respective said rotor, the junction between said first surface and said first arcuate surface forming a first jointure line extending downwardly and rearwardly relative to the axis of rotation of the rotors, to direct the flow of crop material outwardly away from said dividing line and

inwardly toward the corresponding said threshing and separating section to urge said crop material received from said elevator into a spiral path around the circumference of the respective said rotors away from said divider member; and

a pair of side members positioned respectively on the opposing sides of the corresponding said rotors from said divider member, each said side member having a second surface adjacent said elevator and extending upwardly and rearwardly therefrom toward the corresponding said rotor, said second surface joining a second arcuate surface concentric with the axis of rotation of the corresponding said rotor, the junction between said second surface and said second arcuate surface forming a second jointure line extending upwardly and rearwardly relative to the axis of rotation of the rotors, to allow said crop material to follow into a spiral path generated by said rotors around the circumference of the respective said rotor, the clearance between each said first and second surfaces and the respective said auger section decreasing from a forward extremity thereof toward said junction with the respective said arcuate surface.

4,875,891

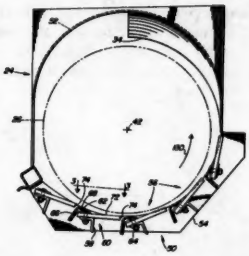
SEPARATING GRATE FOR A GRAIN HARVESTER

Reed J. Turner, East Moline, Ill.; Loren W. Peters, Bettendorf, Iowa; John E. Wilson, Coal Valley, and Robert E. Bennett, Moline, both of Ill., assignors to Deere & Company, Moline, Ill.

Continuation of Ser. No. 22,293, Mar. 2, 1987, abandoned. This application Aug. 5, 1988, Ser. No. 229,784

Int. Cl.[4] A01F *12/24*

U.S. Cl. 460—110 **34 Claims**



1. In a crop material separator in which a rotor having an axis and direction of rotation about the axis is at least partially wrapped by a concave so as to define a crop material processing zone between the concave and the rotor, the concave having a generally arcuate internal surface and comprising:

an array of circumferentially spaced, axially extending finger bar assemblies, each assembly including a plurality of generally circumferentially downstream extending fingers each having a finger tip and all fingers of a given assembly extending in the same general direction, the finger bar assemblies together defining the generally arcuate internal surface of the concave, and each finger bar assembly lying generally within the arcuate surface, but at least some of the finger bar assemblies being angled with respect to the arcuate surface so that, also with respect to the arcuate surface, the finger tips of the fingers of said some of the finger bar assemblies are radially offset with respect to the opposite ends of said fingers and said fingertips are spaced from the finger bar assembly immediately downstream of it.

4,875,892

STEPLESSLY VARIABLE TRANSMISSION CONTROL FOR AUTOMOTIVE VEHICLE

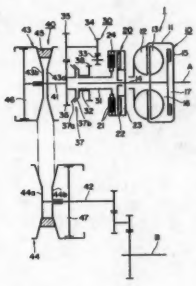
Yutaka Sueda, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 19, 1989, Ser. No. 298,971

Claims priority, application Japan, Jan. 19, 1988, 63-10433

Int. Cl.[4] F16H *11/04*

U.S. Cl. 474—17 **13 Claims**



1. A steplessly variable transmission for automotive vehicles comprising:

transmission means steplessly variable in speed ratio which has a pair of pulleys variable in effective diameter and coupled to each other with endless belt means, one of said pair of pulleys being in association with an vehicle engine and the other being in association with a drive line;

speed ratio control means for varying the speed ratio of the transmission means according to speed ratio change schedules of a target engine speed relative to a vehicle speed depending upon load conditions of the vehicle engine, and

drive mode changing means for changing said steplessly variable transmission in operation between a power drive mode suitable for powerful driving and an economy drive mode suitable for fuel economy driving and changing said speed ratio change schedules to different patterns suitable for said power drive mode and a pattern suitable for said economy drive mode according to the change of drive mode; and

said speed ratio change schedules at a maximum and a minimum engine load being identical between said power drive and economy drive modes, and, between said maximum and minimum engine loads, changing the ratio of change of said target engine speed relative to change of engine load at a relatively high ratio of change within a range of relatively low engine loads for said power drive mode and within a range of relatively high engine loads for said economy drive mode and at a relatively low ratio within a range of relatively high engine loads for said power drive mode and within a range of relatively low engine loads for said economy drive mode.

12. A method of steplessly varying the ratio of speed of an automotive vehicle transmission comprising the steps of:

providing a pair of pulleys variable in effective diameter and coupled to each other with endless belt means, one of said pair of pulleys being in association with a vehicle engine and the other being in association with a drive line, said transmission being changeable in operation between a power drive mode suitable for powerful driving and an economy drive mode suitable for fuel economy driving,

determining an operating drive mode in which said automotive vehicle transmission is operated;

calculating a target engine speed on predetermined speed ratio change schedules of a target engine speed relative to a vehicle speed for one of said power drive mode and said

economy drive mode according to said operating drive mode, said speed ratio change schedules being different depending upon engine loads and the operating drive mode in which said automotive vehicle transmission is operated;

detecting an actual engine speed;

calculating a speed difference between said target engine speed and said actual engine speed,

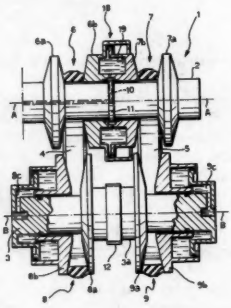
calculating a duty cycle at which duty solenoid valve means is controlled to change a pilot pressure for control valve means so as to change said one of said pair of pulleys in effective diameter according to the calculated speed difference.

4,875,893

CONTINUOUS SPEED VARIATOR WITH EXPANDING PULLEYS

Dante Giacosa, Turin, Italy, assignor to Fiat Auto S.p.A., Turin, Italy

Filed Sep. 23, 1988, Ser. No. 248,015
Claims priority, application Italy, Sep. 23, 1987, 67809 A/87
Int. Cl.[4] F16H *11/02*
U.S. Cl. 474—28 **4 Claims**



1. A continuous speed variator with expandable pulleys comprising a driving shaft, a driven shaft disposed parallel to said driving shaft, first and second expandable drive pulleys located on said first shaft, each of said first and second pulleys having a fixed half-pulley and a movable half-pulley movable relative to said fixed half-pulley with the movable half-pulleys of said drive pulleys being disposed between said fixed half-pulleys and forming parts of a single expandable and contractible body which is freely supported on said first shaft for movement between said fixed half-pulleys, first and second expandable driven pulleys located on said second shaft, first and second driving belts entrained about said first drive and driven pulleys and said second drive and driven pulleys respectively end hydraulic means for causing displacement of said movable half-pulleys for causing displacement of said movable half-pulleys for continuous variation of the speed ratio.

4,875,894

CONTINUOUSLY VARIABLE TRANSMISSION

Paul L. Clark, 3315 Marble Ter., Colorado Springs, Colo. 80906

Filed Sep. 7, 1988, Ser. No. 241,268
Int. Cl.[4] F16H *55/52*
U.S. Cl. 474—49 **26 Claims**

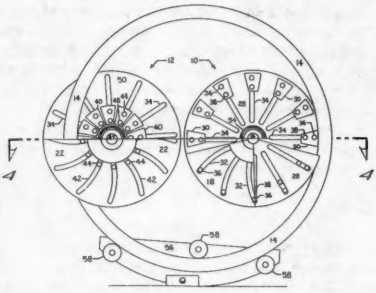
1. A continuously variable transmission comprising:

a. An input shaft rotatable by application of an input torque,

b. An input rotary assembly of variable diameter, comprising a plurality of input contact pads arranged in a circular configuration and in a common plane, which input contact pads may expand outward or move inward to vary the diameter of the input rotary assembly, connected to the input shaft so that the input contact pads are urged outward to increase the diameter of the input rotary assembly by the input torque applied to the input shaft, and so that the input contact pads are caused to rotate by rotation of the input shaft,

c. An output rotary assembly of variable diameter, comprising a plurality of output contact pads arranged in a circular configuration and in a common plane, which output contact pads may expand outward or move inward to vary the diameter of the output rotary assembly,

d. An output shaft to which a load is applied, connected to the output rotary assembly so that the output shaft is



caused to rotate by rotation of the output rotary assembly, and

e. Coupling means to provide mechanical coupling from the input rotary assembly to the output rotary assembly, wherein said coupling means comprises a coupling ring encircling the input rotary assembly and the output rotary assembly, contacting the input rotary assembly so that the coupling ring is caused to rotate as the input contact pads rotate, and contacting the output rotary assembly so that the output rotary assembly is caused to rotate as the coupling ring rotates, which coupling ring couples the input torque and the load.

4,875,895

BUFFING APPARATUS FOR BOOK-FOLD CARTON; AND METHOD

James A. Donnay, Maplewood; Van E. Jensen, Jr., Stillwater, and Bryon S. Kruzel, St. Paul, all of Minn., assignors to Minnesota Mining and Manufcturing, St. Paul, Minn.

Filed Mar. 16, 1988, Ser. No. 168,896
Int. Cl.[4] B31B *1/72*
U.S. Cl. 493—117 **34 Claims**

33. A method of buffing lead and rear depending tails of tape against a bottom side of a carton moving in a first plane; said method including the steps of:

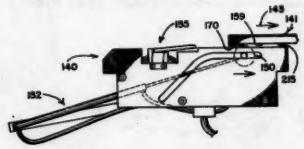
(a) providing a buffing member;

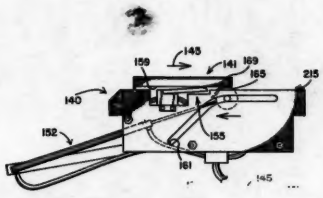
(b) moving said buffing member along a first path of motion against the load tail to buff same against the bottom side of the carton and then to retract the buffing member beneath the rear tail;

(c) following said step (b), passing the carton at least partially over the retracted buffing member; and,

(d) following said step (c), moving said buffing member

along a second path of motion upwardly toward the rear tape tail to buff same against the carton bottom side;





(i) said first and second paths of motion comprising identical, but opposite, paths of motion.

4,875,896

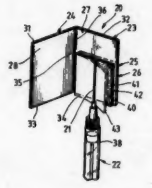
NEEDLE DISPOSAL DEVICE AND METHOD FOR PREVENTING ACCIDENTAL CONTACT WITH A NEEDLE

Sharon L. Kurtz, 335 Ballantrae La., Houston, Tex. 77015

Filed Aug. 29, 1988, Ser. No. 237,326

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—187 **28 Claims**



1. A disposal device for a needle which is adapted for use in a hypodermic syringe, or other sharp medical device, comprising:

at least two planar members, each planar member having front and back surfaces, and top edge, bottom edge, and side edge surfaces and formed of a material able to withstand accidental piercing contact with the needle;

the two planar members being fixedly connected together along a side edge surface of each planar member;

first means for securing the needle to the front surface of one of the planar members wherein the first securing means is an adhesive material disposed on the front surface of one of the planar members and the needle contacts the adhesive material; and

second means for securing together the front surfaces of the planar members upon one of the planar members being moved into contact with the other planar member, whereby the needle may be first associated with the first securing means, and a planar member is then moved to engage the second securing means to fixedly sandwiched the needle between the planar members.

4,875,897

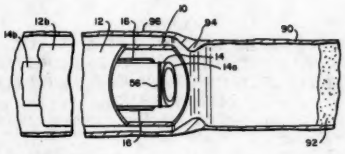
CATHETER ASSEMBLY

Garrett Lee, Sacramento County, Calif., assignor to Regents of University of California, Berkeley, Calif.

Continuation of Ser. No. 63,699, Jun. 12, 1981, abandoned, which is a continuation of Ser. No. 913,639, Sep. 30, 1986, abandoned, which is a continuation of Ser. No. 778,278, Sep. 18, 1985, abandoned, which is a continuation of Ser. No. 326,221, Dec. 1, 1981, abandoned. This application Apr. 6, 1988, Ser. No. 180,728

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—283 **31 Claims**



1. A catheter assembly, comprising:

an outer catheter for insertion into a body channel, said outer catheter having distal and proximal ends;

an inner catheter positionable within said outer catheter and having a distal end that is extendable toward the distal end of said outer catheter;

an inflatable means affixed to the outer surface of at least one of said catheters for forming a seal at the interior walls of the body channel;

optical fibers extending through a portion of said inner catheter for illuminating and viewing the area in front of the distal end of said inner catheter; and

means for positioning said optical fibers relative to the axis of said outer catheter.

4,875,898

INCONTINENCE DEVICE FOR WOMEN

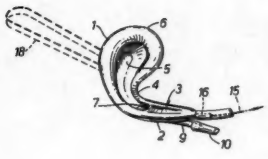
Thomas G. Eakin, 965 Upper Newtownards Rd., Dundonald, Belfast BT16 ORL, Northern Ireland

Continuation of Ser. No. 65,162, Jun. 19, 1987, abandoned, which is a continuation of Ser. No. 741,667, May 24, 1985, abandoned. This application Feb. 6, 1989, Ser. No. 307,235

Claims priority, application United Kingdom, Sep. 27, 1983, 8325848; Sep. 27, 1983, 8325847; Sep. 18, 1984, 8423591

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—331 **10 Claims**



1. An incontinence device for use by females, the device comprising:

a forward-extending, substantially rigid internal leg having a distal end, the internal leg having a forward-facing first curved surface so dimensioned as to conform to or contact the anterior vaginal wall of the female using the device and having a free end for positioning within the vagina;

a U-shaped bight portion connected to the internal leg, the U-shaped bight portion having a curved surface being dimensioned to span the urethral orifice of the female using the device while being in close proximity therewith;

an external leg connected at an acute angle with the internal leg by the U-shaped bight portion to define therewith a generally J-shaped structure with the external leg so dimensioned as to conform to the mons veneris of the female using the device; and

a further, substantially rigid internal leg means connected to the device at the U-shaped bight portion and extending rearwardly from a surface thereof at a substantially fixed right angle to the forwardly extending internal leg and spaced from the distal end of the internal leg towards the cervix of the female using the device, the further leg assisting in retaining the device in position without the necessity of external securing means.

4,875,899

FILTER SYSTEM WITH AN INCORPORATED GAS ESCAPE OPENING, INTENDED TO BE FITTED IN ARTIFICIAL ANUS DRAINAGE BAGS DURING THEIR MANUFACTURE

Henri Holtermann, Jean De Luz, France, assignor to Laboratories Biotrol, Paris, France

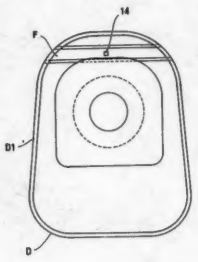
Filed May 6, 1988, Ser. No. 191,019

Claims priority, application France, May 14, 1987, 87 96797

Int. Cl.[4] A61F 5/44

U.S. Cl. 604—333 **12 Claims**

1. A substantially flat elongated gas filter system suitable for incorporation within and as part of an artificial anus drainage bag, the gas filter system having two ends, two sides, two faces, a central permeable core sheet impregnated with adsorbent active material and surrounded by gas impermeable protective plastic material which is in direct contact with the central permeable core sheet throughout its entire length, and



at least one gas escape opening in the protective plastic material on one of the faces, the two ends being free from the gas impermeable plastic material and thus comprising further gas escape openings.

4,875,900

METHOD OF TREATING LEATHER

Vir B. Singh, 6, Rutland Gate, Madras-600008; Kanniah N. G. K. Moorthy, 29, North Railway Station Road, Thiruvothiyur; Madras-600019; Pushpendar K. Kaushik, L-42/K, Bharthi Dasan Colony, K.K. Nagar, Madras-600078, and Hariharan Sankarasub-Ramanian, 2A Bala Krishna Naicken Street, West Mambalam, Madras-600033, all of India

Filed Sep. 22, 1987, Ser. No. 99,780
Int. Cl.[4] C14C *3/06*
U.S. Cl. 8—94.27 6 Claims

1. An improved process for the chemical treatment of animal skins and hides to obtain leather by tanning, rechroming, retanning and dyeing, each of said steps of tanning, rechroming, retanning and dyeing being carried out in the presence of its respective treating liquor the improved process comprising preparing an aqueous dispersion of microcrystalline polymer and adding the prepared aqueous dispersion to the treating liquor such that at least one of said steps of tanning, rechroming, retanning and dyeing is carried out in the presence of the respective liquor with said aqueous dispersion added thereto to improve chrome absorption, said microcrystalline polymer having particles of size up to 2 microns and selected from a polyamide or polyester and maintaining a pH level between 2 to 8.

4,875,901

TREATING FIBROUS POLYAMIDE ARTICLES

George L. Payet, St. Paul, and John C. Chang, New Brighton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 201,381, Jun. 1, 1988, abandoned, which is a continuation of Ser. No. 918,376, Oct. 14, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 314,234
Int. Cl.[4] D06M *3/30;* B32B *3/02*
U.S. Cl. 8—115.56 19 Claims

1. A method for providing fibrous polyamide materials with stain resistance comprising contacting the fibrous polyamide materials with an aqueous solution comprising a normally solid, water-soluble, partially sulfonated novolak resin, which comprises the condensation product of at least one phenolic compound and an aldehyde, and a water-soluble magnesium salt at a pH in the range of from 2 to 12.

11. A fibrous polyamide material treated according to the method of claim 1.

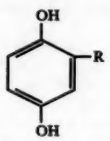
4,875,902

ALKYL DERIVATIVES OF HYDROQUINONE AS ANTIOXIDANTS IN OXIDATION DYEING COMPOSITIONS

Jean F. Grollier, Paris, and Jean Cotteret, Franconville, both of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 389,473, Jun. 17, 1982, abandoned. This application Oct. 16, 1987, Ser. No. 110,107
Claims priority, application France, Jun. 18, 1981, 81 12058
Int. Cl.[4] A61K *7/13*
U.S. Cl. 8—406 18 Claims

1. A dyeing composition which contains at least one oxidation dyestuff precursor and, as antioxidant, at least one compound corresponding to the formula:



(I)

in which R denotes a linear or branched alkyl group having 1 to 4 carbon atoms, said antioxidant present in an amount sufficient to prevent premature oxidation of the dye composition.

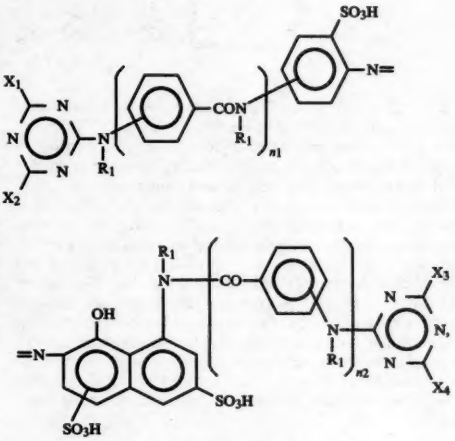
4,875,903

MONOAZO COMPOUNDS CONTAINING A 2-SULFOPHENYL DIAZO COMPONENT RADICAL AND A 1-HYDROXY-NAPHTHALENE-SULFONIC OR DISULFONIC ACID COUPLING COMPONENT RADICAL AND TWO SUBSTITUTED 1,3,5-TRIAZINE RINGS

Reinhard Pedrazzi, Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Jun. 5, 1987, Ser. No. 58,434
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1986, 3619198
Int. Cl.[4] C09B *29/01, 29/036, 29/20, 29/22*
U.S. Cl. 8—640 19 Claims

1. A compound of the formula



or an internal or external salt thereof,

wherein

each R_1 is independently hydrogen, C_{1-4}alkyl or C_{1-4}alkyl monosubstituted by hydroxy halo, cyano or C_{1-4}alkoxy,

each of X_1 and X_3 is independently halo, hydroxy, C_{1-4}alkyl, C_{1-4}alkoxy, phenyl, phenoxy, amino or an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group,

each of X_2 and X_4 is independently an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group containing at least one protonatable nitrogen atom or quaternary ammonium group, and

each of n_1 and n_2 is independently 0 or 1, with the proviso that n_1+n_2 is 1 or 2,

wherein each halo is independently fluoro, chloro or bromo, with the provisos that (1) the total number of basic and cationic groups present as X_1–X_4 equals or exceeds the number of sulfo groups, (2) the hydroxy or alkoxy group of each hydroxy- or alkoxy-substituted alkyl group or alkylene radical attached to a nitrogen atom is bound to a carbon atom other than the C_1-atom, and (3) the hydroxy groups of each alkylene radical substituted by two hydroxy groups are attached to different carbon atoms, or a mixture of such compounds or salts.

4,875,904

COFFEE BEAN ROASTER

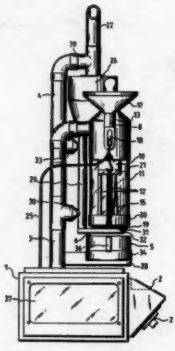
Harald Munk, Stockelsdorf, Fed. Rep. of Germany, assignor to NOVOPACK Maschinenbau GmbH, Fed. Rep. of Germany

Filed Apr. 28, 1988, Ser. No. 187,314

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 3714594

Int. Cl.[4] F26B *11/12*

U.S. Cl. 34—67 22 Claims



1. A coffee bean roaster for small quantities, with a vertically directed cylindrical roasting chamber (11), a fan (35) for supplying air to the roasting chamber (11) for the swirling of coffee beans introduced into the roasting chamber, a suction port (6) for sucking up supply air and a supply-air conduit (3) connected to the suction port, an exhaust-air port (22) which is preceded by a separator device (26) for coffee bean residues transported together with the exhaust air, and a heating device (10) in the supply-air conduit, wherein the hot air blown into the roasting chamber (11) from above is supplied off-center via at least two blowing-in conduits (12) which are directed towards the bottom (19) of the roasting chamber and of which the blowing-out direction relative to the roasting-chamber axis is set at a respective equidirectional oblique angle of up to 30° in the tangential directon of the roasting chamber, whereby continuous circulation of the coffee beans occurs during roasting.

4,875,905

METHOD OF PREPARING A HIGH HEATING VALUE FUEL PRODUCT

Robin Somerville, Galveston, Tex., and Liang-Tseng Fan, Manhattan, Kans., assignors to Solidiwaste Technology, L.P., Manhattan, Kans.

Filed Nov. 14, 1988, Ser. No. 270,040

Int. Cl.[4] C10L *5/40*

U.S. Cl. 44—589 20 Claims

1. A method of preparing a high heating value fuel product comprising the steps of:

blending a high heating value waste material with a cellulosic material;

mixing an organic reagent to the blended mixture of said waste material and said cellulosic material, said organic reagent being a mixture having a 4–15 weight percent of a chemical selected from the group consisting of: triethylene glycol, diethylene glycol, and glycerin propylene glycol;

introducing a pozzolanic agent to the blended mixture for controlling the rate of solidification; and

forming said blended mixture into a form suitable for handling.

7. The method of claim 1, said mixture of said organic reagent further comprising:

a 20–32 weight percent calcium chloride solution.

13. A method of preparing a fuel product comprising the steps of:

blending a mixture of an organic hazardous waste stream with a cellulosic material;

mixing a cross-linking reagent to said mixture, said cross-linking reagent being a chemical selected from the group consisting of: triethylene glycol, diethylene glycol, and glycerin propylene glycol;

blending said mixture and said cross-linking reagent such that cross-linking occurs with organics contained within; and

forming said blended mixture into a form suitable for handling.

4,875,906

PARTIAL OXIDATION OF LOW HEATING VALUE HAZARDOUS WASTE PETROLEUM PRODUCTS

Howard L. Apel, Ontario, Calif., assignor to Texaco Inc., White Plains, N.Y.

Filed Nov. 10, 1988, Ser. No. 269,326

Int. Cl.[4] C10J *3/46*

U.S. Cl. 48—197 R 11 Claims

1. A partial oxidation process comprising:

(1) mixing together low heating value liquid hydrocarbonaceous and/or solid carbonaceous hazardous waste materials from the production, refining and marketing of petroleum products with additional water when needed and about 0.3 to 2.0 wt. % of an anionic surface active agent to produce a stable pumpable aqueous mixture having a solids content in the range of up to about 70 wt. %;

(2) mixing together a solid carbonaceous fuel selected from the group consisting of coal, petroleum coke, asphalt, tar sands, and mixtures thereof with water and from about 0.02 to 1.00 wt. % of an anionic surface active agent to produce a stable pumpable aqueous slurry having a solids content in the range of about 50 to 70 wt. %;

(3) mixing together from about 4 to 19 parts by weight of the mixture from (2) per part by weight of the mixture from (1) to provide a stable pumpable final blend aqueous slurry having a solids content in the range of about 50 to 70 wt. %; and

(4) reacting the final blend aqueous slurry from (3) in a free-flow unobstructed refractory lined partial oxidation reaction zone with a free-oxygen containing gas in a reducing atmosphere at a temperature in the range of about 1900° to 3000° F. and a pressure in the range of about 2 to 250 atmosphere to produce a hot raw effluent gas stream comprising H_2+CO.

4,875,907

THERMALLY STABLE DIAMOND ABRASIVE COMPACT BODY

Cornelius Phaal, Glade Cottage, St. Anne's Glade, Bagshot, Surrey, GU195EF, England, and Richard P. Burnand, 39 Constantia Ave., Alan Manor, Johannesburg, Transvaal, South Africa

Filed Sep. 23, 1987, Ser. No. 100,113

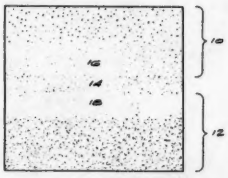
Claims priority, application South Africa, Sep. 24, 1986, 86/7280

Int. Cl.[4] B24D *3/02*

U.S. Cl. 51—293 4 Claims

1. A method of making a composite diamond abrasive compact comprising a thermally stable diamond compact bonded to a cemented carbide substrate including the steps of forming an unbonded assembly comprising a thermally stable diamond compact comprising a mass of diamond particles containing substantial diamond-to-diamond bonding to form a coherent, skeletal mass and a second phase uniformly distributed through the diamond mass, a cemented carbide substrate and a layer of

nickel or a nickel-rich alloy between the compact and substrate, placing the unbonded assembly in the reaction zone of a high pressure/high temperature apparatus, subjecting the unbonded assembly to a temperature of at least 1000° C. and



simultaneously a pressure of at least 30 kilobars for a time sufficient to cause bonding to occur between the compact and substrate and removing the composite diamond abrasive compact from the reaction zone.

4,875,908

PROCESS FOR SELECTIVELY SEPARATING GASEOUS MIXTURES CONTAINING WATER VAPOR

Hiroyasu Kikukawa, 348-7 Otami, Okayama-shi; Eiji Shimoda, 17-24 3-chome, Naka-Cho, Musashino-shi; Mari Sakai, 64-8 Akoda, Okayama-shi, and Fumiko Kitada, 67-13, Nagaoka, Okayama-shi, all of Japan

Filed Jan. 26, 1989, Ser. No. 302,439
Claims priority, application Japan, Jan. 27, 1988, 63-16199
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—16 20 Claims

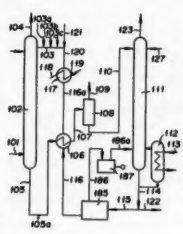
1. A process for selectively separating water vapor from a multiple component gaseous mixture, said process comprising passing a multicomponent gaseous mixture including water vapor along and in contact with a membrane which is selectively permeable to water vapor and wherein the water vapor permeation rate Q_{H2O} is greater than 30 Nm^3/m^2-hr-atm at 25° C. and the ratio of Q_{H2O} to the permeation rate Q_G of the gas to be separated from said water vapor, i.e., Q_{H2O}/Q_G, is greater than 10,000.

4,875,909

METHOD FOR RECOVERY OF ETHYLENE OXIDE

Yukihiko Kakimoto; Masayuki Sawada; Yoshiaki Kajimoto, all of Yokohama, and Isamu Kiguchi, deceased, late of Zushi, all of Japan (by Kuniko Kiguchi, legal representative), assignors to Nippon Shokubai Kasaku Kogyo Co., Ltd., Osaka, Japan and Atochem, Paris, France

Continuation-in-part of Ser. No. 878,113, Jun. 25, 1986, abandoned. This application Dec. 1, 1987, Ser. No. 127,488
Claims priority, application Japan, Jun. 27, 1985, 60-139175; Jul. 4, 1985, 60-145850
Int. Cl.[4] B01D *53/14*
U.S. Cl. 55—40 21 Claims



1. In a method for the recovery of ethylene oxide, comprising the steps of introducing the gas resulting from catalytic gas-phase oxidation of ethylene with a molecular oxygen-containing gas said resultant gas containing ethylene oxide into an absorber and leading said gas into counterflow contact therein with an aqueous absorbent liquid,

recycling part of the residual gas emanating from the top of said absorber to the reactor or said oxidation step of ethylene, introducing an ethylene oxide-containing bottom liquid of said absorber to an ethylene oxide stripper,

heating the bottom of said ethylene oxide stripper with a heating medium,

causing said stripper to liberate a volatile component containing ethylene oxide as a volatile fraction via the top thereof,

forwarding said volatile component to a condenser to condense therein a condensate containing ethylene oxide and water,

leaving uncondensed vapour,

recycling the condensate to the said stripper and passing the said uncondensed vapour to a dehydrator to separate water therefrom,

separating the volatile components from said dehydrator in a light ends stripper to yield ethylene oxide,

subjecting the ethylene oxide produced to purification in an ethylene oxide refiner, and

forwarding part of the liquid withdrawn from the bottom of said stripper to said absorber to be used as an absorbent liquid again, the improvement comprising

introducing the volatile component from said stripper having 0.3 to 0.6 Kg/cm^2 G of a top pressure and 85° to 120° C. of a temperature to a heating zone of said ethylene oxide refiner,

then passing it into a condenser to form a condensate, and recirculating said condensate to the said ethylene oxide stripper, while circulating the uncondensed vapour therefrom to a dehydrator,

subjecting the aqueous liquid having not more than 0.5 ppm of ethylene oxide content withdrawn from the bottom of said stripper to a flashing treatment in a flash tank thereby separating said liquid into a vapour-phase part and an aqueous liquid phase part,

introducing said vapour-phase part in a compressed state into the bottom of said stripper;

introducing said liquid phase as a heat source into a heating means for said ethylene oxide refiner after preheating a liquid which is fed from the bottom of said ethylene oxide absorber to said ethylene oxide stripper, and then recycling said aqueous liquid-phase part into said absorber as an absorbent liquid for use in said absorber.

4,875,910

FILTER FOR REMOVING CANCER CAUSING COMPOUNDS FROM EXHAUST FUMES

Jacques Dunnigan, and Hugues Menard, both of Sherbrooke, Canada, assignors to L'Institut De L'Amiante, Montreal, Canada

Filed Jun. 27, 1985, Ser. No. 749,565
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—74 2 Claims

1. A method for scrubbing an industrial exhaust material which comprises causing said exhaust materials to flow through a bed of dry porous pellets consisting of a mixture of natural magnesium silicate selected from short chrysotile asbestos fibers, attapulgite and mixtures thereof with a cementitious clay binder, the latter representing from 1 to 20% by weight of the dry pellets, whereby substantially all the particulate and gaseous pollutants present in the exhaust material are adsorbed by the dry porous pellets.

4,875,911

APPARATUS FOR SEPARATING GASEOUS MIXTURES

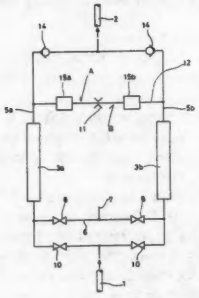
Shinji Mizuno, Kani; Humio Kawato, Kasugai; Kazuyoshi Hanazawa, Naoya; Tatsuaki Aoyama, Ichimiya, and Yoshinari Ogasawara, Kasugai, all of Japan, assignors to CKD Kabushiki Kaisha, Aichi, Japan

Filed Jul. 15, 1987, Ser. No. 73,956

Claims priority, application Japan, Jul. 22, 1986, 61-172572; May 7, 1987, 62-111171; May 7, 1987, 62-111172; May 7, 1987, 62-68081

Int. Cl.[4] B01D 53/04

U.S. Cl. 55—162 3 Claims



1. Apparatus for separating gaseous mixtures comprising a pair of main conduits, each having an associated main separator vessel packed with adsorbent or absorbent material functioning as separating material, the main separator vessels being arranged in parallel with each other with inlet sides of the respective main conduits being connected to a common feed port while outlet sides of the respective main conduits are connected to a common discharge port, said main conduits being interconnected on their discharge sides by a bypass conduit including a stationary or variable throttle means, wherein pressurized unprocessed gaseous mixture consisting of two or more different components fed through the feed port is introduced alternately into the respective main conduits at predetermined time intervals by operating a plurality of switching valves provided in the respective main conduits, there being a separating cycle during which the unprocessed gaseous mixture is fed into one of the main separator vessels to remove one or more components thereof to produce a processed gaseous mixture which is discharged through the discharge port, there further being a regenerating cycle during which the processed gaseous mixture is partially introduced into the bypass conduit, then pressure-reduced through the throttle means interposed in this bypass conduit and the processed gaseous mixture is concentration-reduced and introduced into the other main separator vessel so as to remove the quantity of components previously adsorbed or absorbed by the separating material present in the separator vessel and thereby to regenerate the separating material, wherein the separating and regenerating cycles may be alternately repeated, the apparatus further comprising regeneration promoting separator vessels in the bypass conduit up- and downstream of the throttle means, respectively, the regeneration promoting separator vessels further packed with adsorbent or absorbent material thereby reducing the concentration of the components still remaining in the processed gaseous mixture flowing through the bypass conduit.

4,875,912

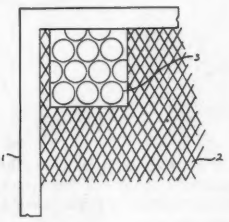
SCENTED FURNACE FILTER

Thomas L. Fulmer, 800 E. Beau St., Apt. L2, Washington, Pa. 15301

Filed Feb. 5, 1988, Ser. No. 152,882

Int. Cl.[4] A61L 9/04

U.S. Cl. 55—279 1 Claim



1. In combination with a filter mounted in a frame for use in a household furnace for mounting in the cold air return of said furnace, a cut-out portion in said filter, a relatively small packet of scenting material inserted into and filling the entire area of said cut-out portion, said packet being sealed by a rear cover and a front cover for said scenting material having a substantially triangular tear tab for progressively exposing at least a portion of said scenting material to enable selective exposure of only the front portion of said scenting material, said tear tab being so located on said front cover as to expose only a portion of the scenting material, leaving uncovered a surrounding portion of the exposed area so that such surrounding portion serves as a reservoir for supplying scenting material to replace that which is discharged from said cut-out portion so as to lengthen the life of the scenting material.

4,875,913

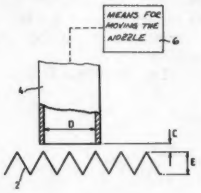
APPARATUS FOR CLEANING CORRUGATED FILTER ELEMENTS

Ytshak Barzuza, Petach Tikva, Israel, assignor to Filtration Water Filters For Agriculture and Industry, Ltd., Herzlin, Israel

Continuation-in-part of Ser. No. 733,736, May 14, 1985, Pat. No. 4,780,151. This application Jul. 7, 1988, Ser. No. 216,181

Int. Cl.[4] B01D 46/04, 29/06

U.S. Cl. 55—294 2 Claims



1. Apparatus comprising:

(a) a corrugated filter element having apices of height E, a corrugated density F, and an open filter fraction G;

(b) a suction nozzle having an inside cross-sectional area A, an inside circumference B, and a maximum width D in a direction perpendicular to the orientations of the corrugations;

(c) means for moving the nozzle over the filter element while maintaining the nozzle a distance C above the apices of said filter elements, wherein:

$$C \leq [A(k_1 - k_2)F \times G) - D \times E]/B$$

where:

$$F = \frac{\text{length of filter portion when stretched flat}}{\text{length, across corrugations, of same portion in corrugated state}}$$

$$G = \frac{\text{total area of openings in element}}{\text{total filter element surface}}$$

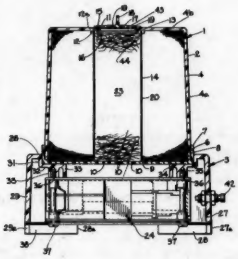
$1.5 \leq k_1 \leq 2.5$ and $0.8 \leq k_2 \leq 1.0$.

4,875,914

GAS & ODOR ADSORBING UNIT

Wallace Wireman, 113 Park Ave., Walton, Boone Cty., Ky. 41094

Filed Mar. 20, 1989, Ser. No. 326,192
Int. Cl.[4] B11D *53/04*
U.S. Cl. 55—389 **17 Claims**



1. An adsorber for removing gasses and odors from the ambient atmosphere, said adsorber comprising a cannister containing a bed of molecular beads constituting a molecular sieve, at least one tubular passage extending through said molecular sieve and being connected to the ambient atmosphere at opposite ends of said cannister, said passage being defined by a peripheral foraminous wall, said molecular sieve being exposed to said ambient atmosphere only at said foraminous wall and means to cause a flow of said ambient atmosphere to pass through said tubular passage, whereby gasses, odors and a minimum of moisture is adsorbed by said molecular sieve from said ambient atmosphere passing through said passage.

4,875,915

METHOD AND APPARATUS FOR TRANSFERRING ENERGY AND MASS

Uwe Rockenfeller, 1453 Rawhide Rd., Boulder City, Nev. 89005

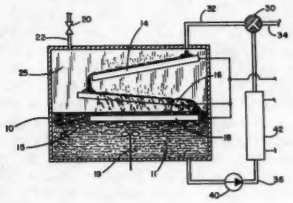
Division of Ser. No. 115,820, Nov. 2, 1987, Pat. No. 4,822,391. This application Jan. 11, 1989, Ser. No. 296,188
Int. Cl.[4] F25D *5/00*
U.S. Cl. 62—4 **22 Claims**

1. Method of transferring and recovering energy comprising

(a) forming a slurry of a liquid selected from the group consisting of long chain alcohols, ethers, glycols, glycol ethers, sebecates, phthalates, aldehydes and ketones and a solid sorbate which does not dissolve in said liquid and is capable of forming a solid/gas compound with a gaseous refrigerant,

(b) mixing said gaseous refrigerant with said slurry whereby said gas forms a solid/gas compound with said solid sorbate, and

(c) exposing the slurry mixture of step (b) to a heat exchange surface whereby the energy from the formation of said



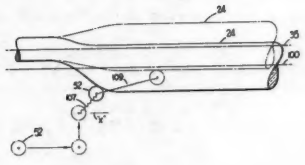
solid/gas compound is transferred to said heat exchange surface.

4,875,916

METHODS OF ADJUSTING THE CONFIGURATION OF OPTICAL SUBSTRATES

Gary L. Baltzer; Brian Lynch, both of Norcross, and William D. O'Brien, Jr., Lilburn, all of Ga., assignors to American Telephone and Telegraph Company, AT&T Technologies, Inc., Berkeley Heights, N.J.

Continuation of Ser. No. 928,436, Nov. 7, 1986, abandoned. This application Sep. 22, 1988, Ser. No. 247,984
Int. Cl.[4] C03B *37/025, 37/012*
U.S. Cl. 65—2 **7 Claims**



1. A method of straightening optical glass substrates from which optical fiber is to be drawn, the method being effective notwithstanding differing diameters among successive substrates to be straightened by said method, said method including the steps of:

supporting end portions of an elongated optical glass, substantially circular substrate so that said substrate is capable of rotation about an axis of rotation which extends through the end portions thereof;

causing the substrate to be turned rotatably about the axis of rotation, the rotating of a substrate which is not substantially straight causing portions of the substrate to be at a greater radial distance from the axis of rotation than are other portions of the substrate;

moving a force-applying contact means which will subsequently engage the substrate and which is effective to straighten the substrate for causing the substrate to be disposed concentrically about the axis of rotation, said movement being in a forward direction parallel to the axis of rotation; while

heating successive increments of length of the substrate in a manner to cause the substrate to be capable of being straightened by the force-applying means by causing the temperature of the increments of the substrate to be sufficiently high to allow straightening of each increment of the substrate upon continuous engagement of the force-applying means with the periphery of said each increment of the substrate while rotating for a predetermined time which will insure circularity of each said increment,

causing the force-applying means to be moved continuously inwardly toward the axis of rotation to a reference point

spaced outside the largest expected radial distance which distance is measured from the axis of rotation to an outer surface of the substrate and then to be moved, in a first mode of contact, in incremental steps of forward and then inward movement toward the axis of rotation until a portion of the substrate and the force-applying means engage each other along a portion of the circumference;

as the rotation of said substrate causes a portion of said substrate which is at a lesser distance from the axis of rotation than a preceding adjacent portion of the substrate to move away from said force applying contact means, causing the force-applying means to be moved further gradually and incrementally forward and inward in a second mode of contact toward the axis of rotation in incremental steps which are substantially less than the steps of the first mode until the force-applying means has remained in continuous engagement with a predetermined portion of the periphery of an increment of length of the rotating substrate which is sufficient to insure that the increment of length of the substrate is disposed concentrically about the axis of rotation; and

cooling the force-applying means to establish a setting of the glass of the successive increments of length of the substrate after said successive increments of length have been straightened;

wherein said force-applying contact means comprises a member having a solid portion of said member in physical contact with said substrate to effect the engaging of the substrate.

4,875,917

METHOD FOR MAKING A LAYERED GLASS ARTICLE

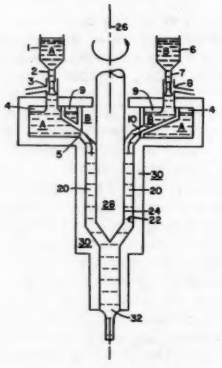
William P. Lentz, deceased, late of Addison, N.Y. (by Cornelia V. Lentz, executrix), assignor to Corning Incorporated, Corning, N.Y.

Division of Ser. No. 925,787, Oct. 31, 1986, Pat. No. 4,784,679. This application Mar. 25, 1988, Ser. No. 173,725

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[4] C03C *25/02*; C03B *5/26, 7/14*; B29D *11/00*

U.S. Cl. 65—3.11 **8 Claims**



1. A method for the continuous manufacture of a glass article having a preselected refractive index profile which comprises the steps of:

(a) providing a mixing zone for the hear mixing of molten glass, the mixing zone including an annular gap between opposing, closed surfaces, at least one of which surfaces is a curved axisymmetric surface which can be rotated with respect to the opposing surface about a rotation axis coinciding with its axis of symmetry,

(b) introducing into the mixing zone a composite molten glass feed stream, the composite feed stream comprising two or more component streams of differing composition, the component streams being geometrically distributed within the composite stream entering the mixing zone such that the relative proportions of at least two of the component streams varies both as a function of angular position about the axis of rotation and as a function of radial distance from the axis of rotation;

(c) rotationally moving the curved axismmetric surface with respect to the other surface while in contact with the composite feed stream for a time sufficient to obtain circumferential mixing of the composite feed stream and spiral layering of at least two of the component streams about the axis of rotation, but insufficient to cause radial glass redistribution and homogenization of the feed stream across the annular gap; and

(d) withdrawing the mixed composed glass feed stream from the mixing zone and cooling the glass to a solid glass article.

4,875,918

METHOD OF MANUFACTURING FIBER PREFORM FOR SINGLE-MODE FIBERS

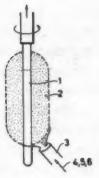
Futoshi Mizutani; Takeshi Kyogoku; Tatsuo Saitoh, and Shigeki Endoh, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 70,001, Jul. 6, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 289,399

Claims priority, application Japan, Jul. 3, 1986, 61-155021

Int. Cl.[4] C03B *37/018*

U.S. Cl. 65—3.12 **6 Claims**



1. A method of manufacturing a glass fiber preform, comprising the steps of:

preparing a starting material of a glass rod provided with an outer coating made at least partially of quartz glass containing chlorine and a core made at least partially of quartz glass containing a component for increasing a refractive index of said quartz glass;

introducing a quartz glass raw material containing silicon and a gas containing chlorine simultaneously into a burner;

performing a flame hydrolysis reaction on said quartz glass raw material containing silicon and said gas containing chlorine to form quartz glass soot, such that said as containing chlorine is dispersed homogeneously within said quartz glass soot;

blowing said quartz glass soot to said starting material to obtain a complex of said quartz glass soot and said glass rod; and

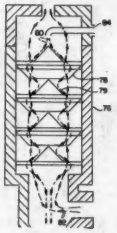
heating and fusing said complex to collapse said complex so as to remove bubbles from said complex.

4,875,919

DIRECT CONTACT RAINING BED COUNTERFLOW CULLET PREHEATER AND METHOD FOR USING

Robert DeSaro, Acton; Edward F. Doyle, Dedham; Christopher I. Metcalfe, East Walpole, and Keith D. Patch, Lexington, all of Mass., assignors to Gas Research Institute, Chicago, Ill.

Filed Apr. 13, 1988, Ser. No. 186,989
Int. Cl.[4] C03B 3/00, 5/00
U.S. Cl. 65—27 17 Claims



1. A method of preheating cullet for use in a glass furnace comprising:

(a) introducing cullet into a preheater near the top thereof;

(b) allowing glass cullet to fall downward through the preheater to form a raining bed while hot gases are introduced near the bottom of the preheater and allowed to flow upward to directly contact the cullet to thereby heat the cullet to temperature below the agglomeration temperature of said cullet but above 700° F.;

(c) controlling the residence time of the cullet in the preheater by deterring the cullet's fall through the preheater with a series of deflectors arranged within the preheater; and

(d) introducing the heated cullet into a furnace containing molten glass.

4,875,920

ION-EXCHANGEABLE PHOSPHATE GLASS COMPOSITIONS AND STRENGTHENED OPTICAL QUALITY GLASS ARTICLES

John D. Myers, Hilton Head Island, S.C., assignor to Kigre, Inc, Hilton Head Island, S.C.

Filed Dec. 4, 1987, Ser. No. 128,676
Int. Cl.[4] C03C 21/00
U.S. Cl. 65—30.14 13 Claims

1. A method for making a thermal shock-resistant phosphate glass article comprising the steps of:

forming an optical phosphate glass article consisting essentially of approximately 50 to 70 mole percent P_2O_5, approximately 5 to 30 mole percent Li_2O, approximately 5 to 25 mole percent MO, wherein M is selected from the group consisting of Be, Mg, Ca, Sr, Ba and Zn and combinations thereof; and

approximately 5 to 25 mole percent X_2O_3 where X is selected from the group consisting of Al, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu and combinations thereof;

at a temperature below the annealing temperature of said optical phosphate glass article, contacting the surface of said optical phosphate glass article with a salt bath, said salt bath containing ionic radii larger than the ionic radius of an ion of lithium;

diffusing said selected ions into the surface of said optical phosphate glass article such that said selected ions replace lithium ions in said phosphate glass article to create a compressive surface layer of said phosphate glass article such that said phosphate glass article has increased thermal shock resistance.

4,875,921

BACTERIAL AGRICULTURAL INOCULANTS

Alan Paau, Middleton, Wis., assignor to Agracetus Corporation, Middleton, Wis.

Continuation of Ser. No. 727,029, Apr. 25, 1985, abandoned. This application Jun. 26, 1987, Ser. No. 67,428
Int. Cl.[4] C05F 11/08
U.S. Cl. 71—7 7 Claims

5. An inoculant for legume seeds, consisting essentially of a mixture of dry, dormant but viable Rhizobium bacteria together with a porous, chemically inert perlite carrier, wherein the bacteria-carrier mixture has been air-dried to a substantially moisture-free state and the weight ratio, pre-drying, of concentrated bacteria suspension to dry carrier is in the range of about 0.5–1.5, and the bacteria is present in the mixture at a density in excess of 10^9 bacteria per gram.

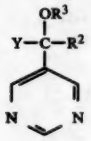
4,875,922

PYRIMIDINE DERIVATIVES

Raymond Elliott, Lower Earley, nr. Reading; David A. Griffin, Wokingham, and Raymond S. Gairns, Whitefield, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Dec. 15, 1987, Ser. No. 133,450
Claims priority, application United Kingdom, Dec. 23, 1986, 8630824; Jul. 3, 1987, 8715684
Int. Cl.[4] A01N 43/54; A61K 31/505; C07D 239/26
U.S. Cl. 71—76 11 Claims

1. A pyrimidine derivative having the formula (I):



(I)

and stereoisomers thereof, wherein Y is cyclopropyl optionally substituted by lower alkyl or halogen or 1-methylcyclopropyl optionally substituted by lower alkyl or halogen or Y is the group:

wherein R^1 is hydrogen or methyl; X is hydrogen or halogen; R^2 is an alkyl, cycloalkyl, cycloalkylalkyl or alkylcycloalkyl group, each of said groups having a total of from 4 to 8 carbon atoms, said alkyl group being optionally substituted by halogen, and said cycloalkyl, cycloalkylalkyl or alkylcycloalkyl groups being optionally substituted by halogen or, in the cycloalkyl ring, by lower alkyl; or R^2 is an alkenyl, cycloalkenyl, cycloalkenylalkyl, or alkylcycloalkenyl group, each of said groups having a total of from 4 to 8 carbon atoms, said alkenyl group being optionally substituted by halogen, and said cycloalkenyl, cycloalkenylalkyl or alkylcycloalkenyl groups being optionally substituted by halogen or, in the cycloalkenyl ring, by lower alkyl; or R^2 is an alkynyl group having a total of from 4 to 8 carbon atoms optionally substituted by halogen; and R^3 is hydrogen, an alkyl group having from 1 to 4 carbon atoms, an alkenyl group having from 3 to 4 carbon atoms or an alkynyl group having from 3 to 4 carbon atoms; and agrochemically acceptable salts and esters.

10. A plant growth regulating composition comprising a plant growth regulating amount of a pyrimidine derivative according to claim 1 and an agrochemically acceptable carrier or diluent.

4,875,923

N-PYRIDINYLSULFONYL-N'-PYRIMIDINYLURES

Rolf Schurter, Binningen; Willy Meyer, and Werner Föry, both of Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

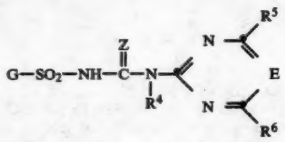
Continuation-in-part of Ser. No. 719,614, Apr. 3, 1985. This application Oct. 26, 1987, Ser. No. 114,993

Claims priority, application Switzerland, Apr. 11, 1984, 1822/84

Int. Cl.[4] C07D *401/12;* A01N *43/54*

U.S. Cl. 71—92 14 Claims

1. A sulfonylurea of formula I



(I)

wherein

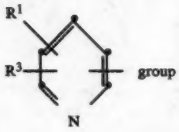
E is the methine bridge,

Z is oxygen or sulfur,

R^4 is hydrogen or C_1-C_4alkyl,

R^5 and R^6 are each independently hydrogen, halogen, C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylthio, C_3-C_6dialkoxyalkyl, C_1-C_4haloalkylthio, C_2-C_4-alkoxyalkyl, C_3-C_6-cycloalkyl or $—NR^{12}R^{13}$,

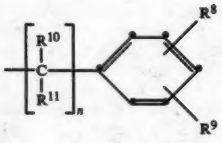
G is a



group

R^1 is hydrogen, halogen, nitro, C_1-C_4alkyl, C_1-C_4alkoxy, trifluoromethyl, trifluoromethoxy, difluoromethoxy, C_1-C_4alkyl carbonyl or $—COOR^{14}$,

R^3 is a



group,

n is 0, 1 or 2,

R^8 is hydrogen, C_1-C_4alkyl, C_1-C_4alkoxy, halogen, C_1-C_4haloalkyl, nitro, $—COOR^{14}$, C_1-C_4haloalkoxy, $—O—CR^{15}R^{16}—COOR^{14}$ or $—O—CR^{15}R^{16}—CN$,

R^9 is hydrogen, halogen, C_1-C_4alkyl, C_1-C_4alkoxy, C_2-C_4alkoxyalkyl oder C_2-C_4alkoxyalkoxy,

R^{10} and R^{11} are each independently hydrogen or C_1-C_4alkyl,

R^{12} and R^{13} are each independently hydrogen or C_1-C_4alkyl,

R^{14} is hydrogen, C_1-C_4alkyl, C_2-C_4alkenyl, C_3-C_4alkynyl, or is C_1-C_4alkyl which is substituted by C_1-C_4alkoxy, halogen or phenyl, and

R^{15} and R^{16} are each independently hydrogen or C_1-C_4alkyl, or a salt thereof.

4,875,924

CINNOLINE DERIVATIVE, PROCESS FOR PREPARING THE SAME AND HERBICIDAL COMPOSITION CONTAINING THE SAME

Masato Mizutani, Toyonaka; Masao Shiroshita, Nishinomiya; Masaharu Sakaki; Hiroki Okuda, both of Toyonaka, and Nobuaki Mito, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

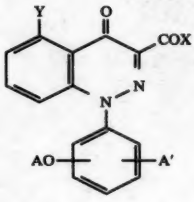
Filed Dec. 24, 1987, Ser. No. 137,626

Claims priority, application Japan, Dec. 25, 1986, 61-309981

Int. Cl.[4] C07D *237/28;* A01N *43/58*

U.S. Cl. 71—92 7 Claims

1. A cinnoline derivative having the formula (I):



(I)

in which

X is —OH, $—O^-M^+$, $—OR^1$ or

wherein

M^+ is an alkali metal cation, an alkaline earth metal cation or

in which R^4, R^5 and R^6 are the same or different and each is hydrogen atom, C_1–C_6 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_3–C_8 cycloalkyl, benzyl or phenyl; R^1 is C_1–C_9 alkyl, C_3–C_6 alkenyl, C_3–C_4 alkynyl, C_1–C_3 alkoxy (C_1–C_4) alkyl, C_3–C_8 cycloalkyl, benzyl or phenyl; and R^2 and R^3 are the same or different and each is hydrogen, C_1–C_6 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_3–C_8 cycloalkyl, benzyl in which at most two hydrogen atoms at the α-position thereof may be substituted by methyl, C_2–C_3 hydroxyalkyl or phenyl in which at most three of hydrogen atoms thereof may be substituted by the same or different C_1–C_2 alkyl;

Y is fluorine, chlorine, bromine, trifluoromethyl, C_1–C_6 alkoxy or C_1–C_2 alkyl;

A is CF_3, CHF_2, CF_2Cl, CF_2Br, CF_2CHF_2, CH_2CF_3, CF_2CHCl_2, $CFClCHFCl$, CF_2CHFCl or CF_2CHFCF_3; and

A′ is hydrogen, fluorine, chlorine or bromine.

4,875,925

HERBICIDAL METHOD USING DIFLUFENICAN

Richard H. Hewett, Thaxted, and Brian M. Luscombe, Chelmsford, both of England, assignors to May & Baker Limited, Dagenham, England

Filed Jul. 17, 1987, Ser. No. 74,578

Claims priority, application United Kingdom, Jul. 21, 1986, 8617740

Int. Cl.[4] H01N *43/40*

U.S. Cl. 71—94 5 Claims

1. A method of controlling the growth of *Galium aparine* at

a locus which comprises applying to the locus an effective amount of (a) pendimethalin and (b) diflufenican, which is N-(2,4-difluorophenyl)-2-(3-trifluoromethylphenoxy)nicotinamide, wherein the ratio of (a) to (b) is from 20:1 to 4:1 by weight.

4,875,926
3-FLUOROPYRIDYL-2-OXY-PHENOXY DERIVATIVES HAVING HERBICIDAL ACTIVITY

Rolf Schurter, Binningen, and Peter J. Diel, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

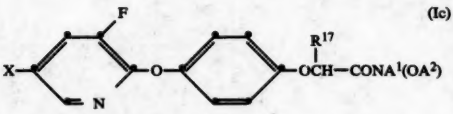
Division of Ser. No. 844,407, Mar. 26, 1986, Pat. No. 4,740,235. This application Feb. 1, 1988, Ser. No. 150,680

Claims priority, application Switzerland, Apr. 1, 1985, 1401/85

Int. Cl.[4] C07D *213/56*; A01N *43/40*

U.S. Cl. 71—94 **7 Claims**

1. A 3-fluoropyridyl-2-oxy-phenoxy derivative of the formula Ic



(Ic)

wherein X is chlorine, A^2 is methyl, ethyl, C_3–C_4-alkenyl or C_3–C_4-chloroalkenyl, A^1 is hydrogen or methyl and R^{17} is methyl.

4,875,927
FORMULATION PROCESS

Tharwat F. Tadros, Wokingham, England, assignor to Imperial Chemical Industries PLC, London, England

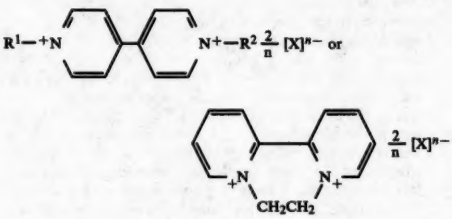
Filed Jan. 13, 1988, Ser. No. 143,348

Claims priority, application United Kingdom, Jan. 13, 1987, 8700658

Int. Cl.[4] H01N *25/32*

U.S. Cl. 71—94 **7 Claims**

1. A concentrated herbicidal composition comprising 75 grams or more per liter of a herbicidal bipyridylium diquaternary salt of the formula:



wherein R1 and R2, which may be the same or different each stand for an alkyl or alkanyl radical of 1 to 4 carbon atoms, which may be substituted by a hydroxy, carboxy, alkoxy, alkylcarbonyl, alkoxycarbonyl, carbamoyl or N-alkyl-substituted carbamoyl radical or a halogen atom; $[X]^{n-}$ represents an anion and n is 1, 2, 3 or 4; the said composition having a reduced oral toxicity towards mammals as compared with compositions consisting of a concentrated aqueous solution of a herbicidal bipyridylium diquaternary salt, the said compositions being prepared by a process comprising as a first step agitating an aqueous solution of a herbicidal bipyridylium diquaternary salt with an oil and a first emulsifier having a low HLB value to give a first emulsion comprising droplets of herbicidal bipyridylium diquaternary salt solution dispersed in a continuous oil phase, and as a second step, agitating the first emulsion with water and a second emulsifier having a high HLB value to give a second emulsion comprising drops of the first emulsion dispersed in a continuous aqueous phase, and wherein the water used to prepare the second emulsion contains a solute in sufficient concentration to bring the continuous aqueous phase into substantial osmotic balance with the aqueous solution of the herbicidal bipyridylium diquaternary salt.

4,875,928
SUBSTITUTED AZOLYLCYCLOPROPYL-AZOLYLMETHYL-CARBINOL DERIVATIVES

Erik Regel, Wuppertal; Klaus Böckmann, Cologne; Karl H. Büchel, Burscheid; Klaus Lürssen, Bergisch-Gladbach; Wilhelm Brandes, Leichlingen; Jörg Konze, Cologne, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

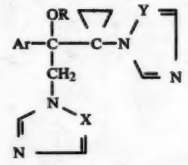
Filed Oct. 28, 1985, Ser. No. 792,089

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440117

Int. Cl.[4] A01N *43/653, 43/64*; C07D *249/08, 233/60*

U.S. Cl. 71—92 **13 Claims**

1. A substituted azolylcyclopropylazolylmethyl-carbinol derivative of the formula



in which

Ar is phenyl optionally substituted by halogen; alkyl, alkoxy and alkylthio, each having 1 to 4 carbon atoms; halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms; and/or phenyl and phenoxy, each of which is optionally substituted by alkyl having 1 or 2 carbon atoms and/or halogen; or is naphthyl, or is furyl, thienyl, pyridinyl or pyrimidinyl, each of which is optionally substituted by the above-mentioned phenyl substituents;

R is hydrogen, alkyl having 1 to 4 carbon atoms, alkenyl or alkvinyl, each having 2 to 4 carbon atoms, trialkylsilyl having 1 to 4 carbon atoms in each alkyl part, alkylcarbonyl having 1 to 4 carbon atoms in the alkyl part, and/or phenylalkyl which has 1 or 2 carbon atoms in the alkyl part and optionally substituted by those phenyl substituents already mentioned in the case of Ar, and

X and Y each independently is a nitrogen atom or a CH group,

or an addition product thereof with an acid or metal salt.

4,875,929
AQUEOUS SUSPENSION CONCENTRATE COMPOSITIONS

Leonard J. Morgan, and Mark Bell, both of Fareham, England, assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 867,107, May 23, 1986, abandoned. This application May 7, 1987, Ser. No. 45,458

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.[4] A01N *33/08*

U.S. Cl. 71—121 **12 Claims**

1. An aqueous suspension concentrate composition comprising, on a weight to volume basis: about 5.0% to 50.0% solid

pendimethalin; about 3.0% to 30.0% nonpesticidal coformulants; and about 20.0% to 92.0% water.

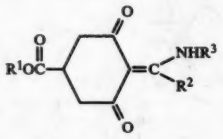
4,875,930

CYCLOHEXANE DERIVATIVES HAVING PLANT GROWTH REGULATING ACTIVITIES AND APPLICATIONS THEREOF

Masafumi Matsuzawa; Hiroshi Hokari; Shoji Kusano, all of 132, Ojima, Fukude-cho, Iwata-gun, Shizuoka-ken; Takeshige Miyazawa, and Yasufumi Toyokawa, both of 1809, Kamo, Kikugawa-cho, Ogasa-gun, Shizuoka-ken, all of Japan

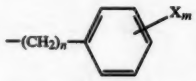
Continuation of Ser. No. 854,879, Apr. 21, 1986, abandoned.
This application Apr. 26, 1988, Ser. No. 186,663
Claims priority, application Japan, Apr. 26, 1985, 60-90675; Mar. 18, 1986, 61-59986
Int. Cl.[4] A01N *37/00*; C07C *69/74*
U.S. Cl. 71—106 19 Claims

1. A compound of formula (I)

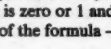


(I)

wherein R^1 is a hydrogen atom or a lower alkyl group; R^2 is a lower alkyl group; R^3 is a hydrogen atom, an alkyl group of 1–6 carbon atoms, an alkenyl group of 1–6 carbon atoms, a hydroxyalkyl group of 1–6 carbon atoms, a cycloalkyl group of 3–6 carbon atoms, an aminoalkyl group of 1–6 carbon atoms, an N-alkylaminoalkyl group of 1–6 carbon atoms, an N,N-dialkylaminoalkyl group of 1–6 carbon atoms, an alkoxycarbonylalkyl group of 1–6 carbon atoms, a group of the formula $-(CH_2)_l-R^4$ where R^4 is a lower alkoxy group, a lower alkylthio group, a benzylthio group, an anilino group, l is 2 or 3, a group of the formula



where X is a halogen atom, a lower alkyl group, a lower alkoxy group, a phenoxy group or an alkoxycarbonylalkyloxy group of 1–6 carbon atoms, m is zero or 1 and n is an integer of zero to 2, inclusive, a group of the formula $-CH_2-R^5$ where R^5 is a group of the formula



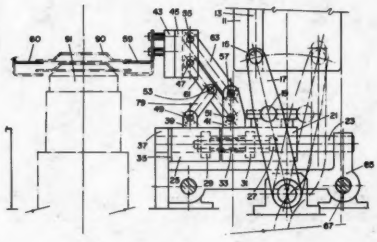
where R^5 is as defined above; and a salt of said compound.

4,875,931

PARTS TRANSFER SYSTEM HAVING THREE ORTHOGONAL MOVEMENT AXES WHEREIN THE PART LIFTING AND LOWERING MECHANISM MOVING ALONG THE THIRD AXIS IS ACTUATED BY THE MOTION OF THE GRIPPERS IN CLOSING AND OPENING ALONG THE FIRST AXIS

Luciano T. S. Monteiro, Sao Caetano do Sul, Brazil, assignor to Prodty Engenharia E Comercio Ltda, S. Caetano Do Sul, Brazil

PCT No. PCT/BR88/00004, § 371 Date Sep. 8, 1988, § 102(e) Date Sep. 8, 1988, PCT Pub. No. WO88/07419, PCT Pub. Date Oct. 6, 1988
PCT Filed Mar. 18, 1988, Ser. No. 266,637
Claims priority, application Brazil, Mar. 24, 1987, PI8701734
Int. Cl.[4] B21J *13/08*
U.S. Cl. 72—405 5 Claims



1. In a system for transferring parts between work stations and having part gripper means movable along three orthogonal axes, the first being the opening and closing movement of the gripper means, the second being the transfer movement of the gripper means between stations, and the third being the lifting and lowering movement of the gripper means at a station, the improvement comprising:

mechanism connected to said gripper means for effecting opening and closing movements thereof along said first axis and lifting and lowering movements thereof along said third axis, including:

cam-driven first part means guided for linear movement;

second part means guided for linear movement with said first part means;

lost-motion means connecting said parts;

means urging said parts to move linearly apart;

stop means for stopping movement of said second part means while said first part means continues to move linearly in a direction to close said gripper means;

lever means connected between said first and second part means and said gripper means to effect cessation of closing movement thereof and effect lifting movement thereof along said third axis while said second part means is stopped and effect lowering movement of said gripper means while said first part means moves in the opposite direction until said second part means moves therewith and then effect opening movement of said gripper means.

4,875,932

APPARATUS FOR MEASURING A FLOW RATE

Yoshichika Uchiyama, Hino, and Atsushi Tsuchiya, Hachioji, both of Japan, assignors to Cosmo Instruments Co., Ltd., Tokyo, Japan

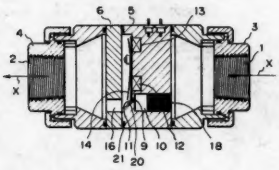
Filed Dec. 16, 1988, Ser. No. 285,798
Claims priority, application Japan, May 26, 1988, 63-129882
Int. Cl.[4] G01F *5/00*
U.S. Cl. 73—202 5 Claims

1. An apparatus for measuring a flow rate of a fluid comprising;

(a) a body having an inlet and an outlet

(b) a by-pass passage defined between said inlet and said outlet inside said body and forming a part of a flow passage through which said fluid flows for allowing a first portion of said fluid to flow therethrough, a flow rate of said first portion of said fluid being not measured,

(c) a measurement passage defined between said inlet and said outlet inside said body, forming another part of said flow passage for allowing a second portion of said fluid to flow therethrough and including a measurement hole and an introducing hole, said introducing hole being disposed on an upstream side of said measurement hole and having an opening area larger than that of said measurement hole for introducing said second portion of said fluid to said measurement hole, a flow rate of said second portion of said fluid being measured,



(d) a plurality of first fine tubes disposed in said by-pass passage for straightening a flow of said first portion of said fluid passing through said by-pass passage,

(e) a plurality of second fine tubes disposed in said introducing hole for straightening a flow of said second portion of said fluid passing through said introducing hole,

(f) a flexible cantilever-shaped pressure-receiving plate disposed on a downstream side of said measurement hole in such a manner as to face a flow of said second portion of said fluid from said measurement hole and thus intersect substantially orthogonally said flow from said measurement hole at one end thereof and fixed to said body at the other end thereof, and

(g) a deflection detector for measuring an amount of deflection of said pressure-receiving plate.

4,875,933

MELTING METHOD FOR PRODUCING LOW CHROMIUM CORROSION RESISTANT AND HIGH DAMPING CAPACITY FE-MN-AL-C BASED ALLOYS

Chi-Meen Wan, New Canaan, assignor to Fansy Steel Corporation, Pittsburgh, Pa.

Filed Jul. 8, 1988, Ser. No. 218,695
Int. Cl.[4] C21D *1/74*; C22C *38/04*
U.S. Cl. 75—10.17 **12 Claims**

1. The melting method for producing a (of the said) Fe-Mn-Al-C alloy which comprises melting ferromanganese and steel scrap in an arc furnace, adjusting the carbon content of the resulting melt to be not more than about 1.4% by oxygen blowing, melting aluminum in a separate furnace, mixing the molten metals in a furnace and then pouring molten metal mixture into a ladle for further mixing by blowing with a non-oxidizing gas to obtain a homogeneous composition, and tapping the resulting Fe-Mn-Al-C melt.

4,875,934

METHOD OF DEOXIDIZING MOLTEN FERROUS METALS

Glenn Canfield, 303 Ramblewood Pl., Longview, Tex. 75601-3055

Division of Ser. No. 140,125, Dec. 31, 1987, Pat. No. 4,801,328. This application Oct. 24, 1988, Ser. No. 261,842
Int. Cl.[4] C21C *7/02*
U.S. Cl. 75—58 **13 Claims**

1. A method of deoxidizing molten ferrous metal confined within a container open above the surface of the ferrous metal, comprising the steps of:

preparing a deoxidizing agent, in the form of billets of any convenient size and shape, each billet having a core of material chemically non-reactive with the ferrous metal to be deoxidized and which has a density greater than the density of metallic aluminum, and having one or more discrete layers of metallic aluminum substantially surrounding said core; and

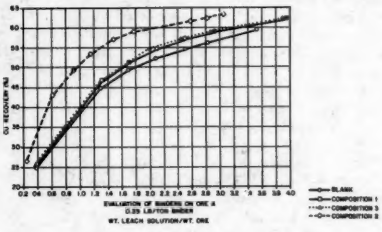
introducing one or more billets of said deoxidizing agent into the molten ferrous metal to be deoxidized by gravitationally induced free fall from any convenient point above the surface of said molten ferrous metal and allowing each said billet unconstrained movement relative to said molten ferrous metal, whereby said metallic aluminum substantially surrounding said core of each billet of said deoxidizing agent is brought into contact with said molten ferrous metal to achieve deoxidation thereof.

4,875,935

ANIONIC ACRYLAMIDE POLYMERS AS COPPER ORE AGGLOMERATION AIDS

Anthony E. Gross, St. Charles, and Jacqueline L. Bonin, Oak Park, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Nov. 4, 1988, Ser. No. 267,134
Int. Cl.[4] C22B *15/08*
U.S. Cl. 75—117 **5 Claims**



1. An improved method for extracting copper from copper minerals by heap leaching with dilute sulfuric acid which comprises agglomerating the copper minerals prior to their being formed into a heap with an agglomerating agent comprising an anionic acrylamide polymer which contains at least five mole percent of carboxylate or sulfonate groups and has a molecular weight of at least 100,000 , and then leaching copper from said copper minerals by heap leaching with dilute sulfuric acid, collecting the copper-rich leachate, and recovering copper therefrom.

4,875,936

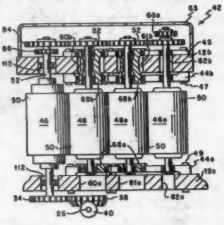
CONVERSION OF LETTERPRESS TO OFFSET PRINTING

Carl J. Hermach, Gulfport, Fla., assignor to Publishers Equipment Corporation, Carrollton, Tex.

Division of Ser. No. 747,383, Jun. 21, 1985, Pat. No. 4,677,911, which is a continuation of Ser. No. 473,967, Mar. 10, 1983, abandoned, which is a continuation-in-part of Ser. No. 209,222, Nov. 24, 1980, abandoned, which is a continuation-in-part of Ser. No. 175,126, Aug. 4, 1980, abandoned, which is a continuation-in-part of Ser. No. 122,908, Feb. 20, 1980, abandoned. This application Jul. 1, 1987, Ser. No. 68,663
Int. Cl.[4] B41F *5/06, 5/22*
U.S. Cl. 101—218 **10 Claims**

1. In an offset press unit having a main frame defining a pair of spaced apart walls having bores therein, a pair of plate cylinders disposed within said frame and rotatably supported

in spaced apart relation, and a pair of blanket cylinders disposed within said frame, each rotatably supported for rolling contact with the other and with one of said plate cylinders, external support means on only one of said walls and secured thereto, including at least one cylinder supporting bearing entirely outside the main frame, internal support means secured to at least the other of said walls and including at least one cylinder supporting bearing entirely inside the main frame, and one of said cylinders rotatably supported by said cylinder supporting bearings, said rotatably supported cylinder being supported at one end only by said at least one bearing of said



internal support means and at the other end by at least said bearing of said external support means, wherein said internal support means includes separate support means secured to each of said walls, each said separate support means including at least one bearing entirely inside the main frame, said rotatably supported cylinder being supported at one end only by said at least one bearing of one of said separate support means of said internal support means and at the other end by at least one bearing of the other of said support means of said internal support means andalso by said at least one bearing of said external support means.

4,875,937

CEMENTITIOUS COMPOSITION

Robert F. Viles, Curdworth, Great Britain, assignor to Fosroc International Limited, Birmingham, England

Filed Oct. 21, 1988, Ser. No. 260,976

Claims priority, application United Kingdom, Oct. 29, 1987, 87 25385

Int. Cl.[4] C04B *7/32, 11/06*

U.S. Cl. 106—104 **14 Claims**

1. A dry cementitious composition for admixture with water to form a rapid setting and hardening material, the composition comprising:

high alumina cement making up from about 10% to about 50% of the composition,

calcium sulphate in the form of beta anhydrite present in an amount of at least 11.4%,

aluminum sulphate in a proportion of from about 1% to about 13% by weight relative to the high alumina cement,

a source of free lime in a proportion of from about 3% to about 9% by weight relative to the high alumina cement,

a reactive filler making up at least 10% by weight of the composition,

whereby ettringite is formed on hydration and the hydrated material is durable.

4,875,938

METHOD OF MAKING A MORTAR BINDER AND PRODUCT

Norman V. Filbert, Bay City, Box 19-22, Stevensville, Md. 21666

Filed Nov. 16, 1987, Ser. No. 120,939

Int. Cl.[4] C04B *2/04, 2/10*

U.S. Cl. 106—120 **10 Claims**

1. The method of making a cementitious binder for use in mortars comprising heating marine shell material to about 2100° to 2350° F.; allowing said shell material to cool to ambient temperature; mixing water with the cooled shell material in the ratio of about one part of water by volume to about five parts of shell material by volume; allowing said mixture to spontaneously heat; and monitoring the heat level of said mixture until it commences to cool and as it cools is converted into a dry, substantially white, powdery material substantially of the consistency of talcum powder in readiness for use as a binder in mortar.

4,875,939

PRECOMBUSTION CHAMBER CONSTRUCTION FOR AN INTERNAL COMBUSTION ENGINE

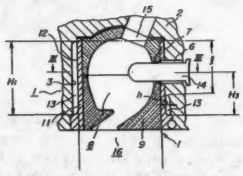
Yasuhiro Miyakawa, and Minoru Machida, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Sep. 8, 1988, Ser. No. 241,899

Claims priority, application Japan, Sep. 14, 1987, 62-139324[U]

Int. Cl.[4] F02B *19/16*

U.S. Cl. 123—271 **4 Claims**



1. A ceramic precombustion chamber construction for an internal combustion engine, comprising:

a precombustion chamber formed by a ceramic body to be inserted into a precombustion chamber receiving cavity of a metal cylinder head, said ceramic body having a glow-plug receiving aperture; and

a metal sleeve fitted on an outer circumference of said ceramic body and having a plurality of projections on an outer circumferential surface thereof, one of said projections being formed with a glow-plug receiving aperture which communicates with a glow-plug receiving aperture formed in said ceramic body;

wherein said precombustion chamber receiving cavity of said metal cylinder head communicates with glow-plug receiving apertures provided in said metal cylinder head, metal sleeve and ceramic body, and an inner circumferential surface of said precombustion chamber receiving cavity of said metal cylinder head forms thermal insulating spaces with said projections provided on the outer circumferential surface of said metal sleeve.

4,875,940

MASSECUITE SUPERSATURATION MONITOR

David J. Radford, Maidstone, South Africa, assignor to The Tongaat-Hulett Group Limited, Mount Edgecombe, South Africa

Continuation of Ser. No. 724,847, Apr. 18, 1985, abandoned. This application Feb. 25, 1988, Ser. No. 161,301

Claims priority, application South Africa, Apr. 19, 1984, 84/2976

Int. Cl.[4] B01J *2/00*

U.S. Cl. 127—2 **1 Claim**

1. Apparatus for controlling the supersaturation of a mother liquor and the crystal content of massecuite comprising:

(a) probe means adapted to continuously measure both the series resistance and the series capacitance of the massecuite, said probe means being located in a vacuum pan at a zone of vigorous circulation;

(b) a voltage divider including a resistor in series with a series tuning circuit and said probe means, said voltage

divider being supplied with a signal in the radio frequency range to create an output signal;

(c) converter means for converting the output signal from the voltage divider to a suitable signal to be used by control instruments;

(d) calibration means for calibrating the output signal from the voltage divider;

(e) first control means to continuously keep the probe and tuning circuit in resonance;

(f) measuring means to measure both the impedance of the probe and tuning circuit at resonance and changes in capacitance necessary to keep the circuits in resonance;

(g) calibrating means to calibrate the probe and tuning circuits such that the absolute values of massecuite resistance and capacitance can be measured; and

(h) second control means to derive optimum signals for control of crystal content, and mother liquor Brix using the calibrated probe output signals.

4,875,941

DEACTIVATION OF REACTIVE ORGANOMETALLIC CONTAMINATED EQUIPMENT

Andrzej M. Piotrowski, Houston, and Joseph J. Ligi, LaPorte, both of Tex., assignors to Texas Alkyls, Inc., Deer Park, Tex.

Filed Mar. 10, 1988, Ser. No. 166,338

Int. Cl.[4] B08B 5/00

U.S. Cl. 134—11 6 Claims

1. A method for the treatment of organometallic-contaminated equipment which comprises treating the equipment with gaseous carbon dioxide so as to react with organometallic compounds contaminating the equipment.

4,875,942

METHOD OF CLEANING RESIDUAL DYE MATERIAL FROM ROLLERS OF A TEXTILE FABRIC DRYING OVEN

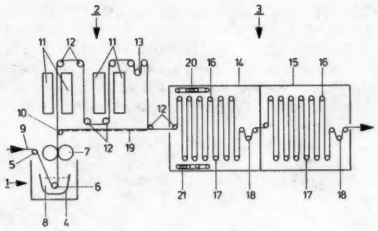
Kurt van Wersch, Wegberg; Helge Freiberg, Monchen-Gladbach, and Peter Mevissen, Erkelenz, all of Fed. Rep. of Germany, assignors to A. Monforts GmbH & Co., Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 226,284

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725419

Int. Cl.[4] B08B 1/02

U.S. Cl. 134—15 10 Claims



1. A method of cleaning residual dye material from rollers of a textile fabric drying oven during passage of a traveling cloth lead therethrough, said method comprising applying a cleaning material to said traveling cloth lead in advance of the oven and rotating rollers to be cleaned at a surface speed different from the surface speed of the cloth lead to cause a cleaning action of the cloth lead against the rollers.

4,875,943

FLEXIBLE PHOTOVOLTAIC DEVICE

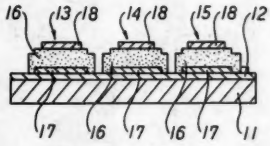
Yoshihiro Hamakawa, Kawanishi; Yoshihisa Tawada; Kazunori Tsuge, both of Kobe, and Masanobu Izumina, Omiya, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 835,717, Mar. 3, 1986, Pat. No. 4,773,942, which is a division of Ser. No. 439,627, Nov. 4, 1982, Pat. No. 4,612,409. This application Jun. 6, 1988, Ser. No. 202,608

Claims priority, application Japan, Nov. 4, 1981, 56-177685; Dec. 15, 1981, 56-203155; Dec. 28, 1981, 56-213119; Apr. 9, 1982, 57-60109

Int. Cl.[4] H01L 31/06, 27/14

U.S. Cl. 136—244 10 Claims



1. A photovoltaic device comprising a substrate including a metal foil and an overlaying electric insulating thin film having an electric conductivity of not more than about 10^{-7} $(\Omega.cm.)^{-1}$ during light impingement, and a photovoltaic device body of a non-single-crystal semiconductor, the device body being formed over said electric insulating thin film, and said electric insulating thin film being a layer of an inorganic material having a thickness of 100 angstroms to 20 μm selected from the group consisting of amorphous $Si_{(1-x)}C_x$, and amorphous $Si_{(1-x-y)}C_xN_y$, their hydrides and their fluorides.

10. The device of claim 1, wherein said substrate is provided with a plurality of photovoltaic device bodies on the electric insulating thin film to give a plurality of generating zones, said generating zones being connected in series to each other.

4,875,944

AMORPHOUS PHOTOELECTRIC CONVERTING DEVICE

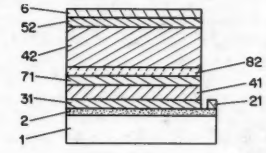
Takashi Yoshida, Kanagawa, Japan, assignor to Fuji Electric Corporate Research and Development, Ltd., Japan

Filed Sep. 9, 1988, Ser. No. 242,887

Claims priority, application Japan, Sep. 17, 1987, 62-233422

Int. Cl.[4] H01C 31/06

U.S. Cl. 136—249 7 Claims

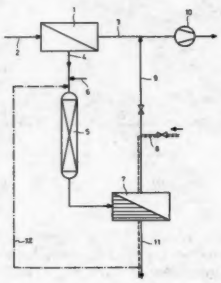


1. An amorphous photoelectric converting device comprising a plurality of photovoltaic elements laminated one on top of the other, each of said elements comprising a p-type layer, an i-type layer, and an n-type layer and having a p-i-n structure with the n-type layer and p-type layer of consecutive elements being adjacent to one another, wherein the adjacent n-type layers and p-type layers of consecutive elements comprise microcrystalline silicon and the remaining layers comprise amorphous silicon, and wherein said p-type layers of microcrystalline silicon are doped with boron, at a concentration ranging from 3×10^{20} to 2×10^{21} atoms/cm^3.

4,875,945
PROCESS FOR CLEANING THE EXHAUST GAS OF A FUSION REACTOR

Ralf-Dieter Penzhorn, Bruchsal, Fed. Rep. of Germany, and Hiroshi Yoshida, Tokai, Japan, assignors to Kernforschungszentrum Karlsruhe GmbH, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,233
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 3731385
Int. Cl.[4] G21B *1/00*
U.S. Cl. 376—146 3 Claims



1. Process for cleaning an exhaust gas from a fusion reactor of exhaust gas components containing heavy hydrogen, the heavy hydrogen components of the exhaust gas being (i) at last one elemental heavy hydrogen isotope selected from deuterium and tritium and (ii) impurities containing the heavy hydrogen isotope deuterium and/or tritium in chemically bound form, the impurities being at least hydrocarbon and water vapor, the exhaust gas further containing carbon monoxide as an impurity, wherein the heavy hydrogen is released from its chemically bound form, and the released heavy hydrogen and the at least one elemental heavy hydrogen isotope (i) are separated from the exhaust gas and returned into the fuel cycle, comprising:

(a) bringing the exhaust gas into a palladium/silver permeator operating at a temperature below 450° C. to decompose into its elements any ammonia in the exhaust gas and to separate the exhaust gas into a first stream containing a major fraction of the elemental heavy hydrogen (i) and elemental heavy hydrogen formed by any decomposition of ammonia and a residual gas stream containing the impurities,

(b) adding carbon monoxide to the residual gas stream if the carbon monoxide/water ratio is less than 1.5 to bring the carbon monoxide/water ratio in the residual gas stream to $\geqq 1.5$,

(c) reacting the water vapor in the residual gas stream with the carbon monoxide at a carbon monoxide/water ratio of $\geqq 1.5$ at 150° to 200° C. on a $CuO/Cr_2O_3/ZnO$ catalyst to produce quantitatively hydrogen and carbon dioxide,

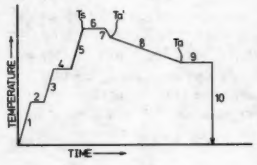
(d) passing the resulting gas stream from step (c) either into a palladium/silver permeator containing a nickel-/aluminum oxide-bulk catalyst or into a nickel catalyst bed followed by a palladium/silver permeator in order to split up the hydrocarbon into its elements and to separate the hydrogen in its elemental form from the remaining gas to form a decontaminated residual gas stream which does not contain any hydrogen and a hydrogen gas stream which contains elemental hydrogen, and

(e) combining the hydrogen gas stream containing elemental hydrogen separated in step (d) with the first stream containing the major fraction of hydrogen separated in step (a).

4,875,946
PROCESS FOR PRODUCING RARE EARTH-COBALT PERMANENT MAGNET

Shiang-Jiun Heh, Taipei; Swe-Kai Chen; Fu-Teh Jin, both of Kaohsiung, and Li-Kou Chen, Taipei, all of Taiwan, assignors to Industrial Technology Research Institute, Chutung, Taiwan

Filed Feb. 2, 1988, Ser. No. 153,503
Int. Cl.[4] H01F *1/02*
U.S. Cl. 148—103 7 Claims



1. A heat-treatment process for producing (Sm_xPr_{1-x}) Co permanent magnets having a remanence of at least 9000 Gauss, an intrinsic coercivity of at least 15,000 Oersted, and a maximum energy product of at least 19.0×10^6 Gauss Oersted comprising the steps of:

(1) compacting a (Sm_xPr_{1-x}) Co_x powder, wherein y is from 4.6 to 5.0 and x is greater than 0.3 and less than or equal to 1, in a magnetic field; sintering said compacted powder at a temperature between 1000° C. and 1200° C. for thirty minutes to one hour;

(2) cooling said sintered alloy powder compact from said sintering temperature to a first cooling temperature in the range of about 920° C. to 1180° C. at a rate greater than 10° C./minute;

(3) cooling said sintered alloy powder compact immediately from said first cooling temperature to a second cooling temperature in the range of about 870° C. to 930° C. at a rate no greater than 10° C./minute;

(4) isothermally annealing said sintered alloy powder compact at said second cooling temperature for 1 to 10 hours;

(5) cooling said sintered alloy powder compact from said annealing temperature to a third cooling temperature in the range of about 280° C. to 320° C. at a rate greater than 40° C./minute; and

(6) cooling said sintered alloy immediately from said third cooling temperature to room temperature as soon as possible.

4,875,947
METHOD FOR PRODUCING GRAIN-ORIENTED ELECTRICAL STEEL SHEET HAVING METALLIC LUSTER AND EXCELLENT PUNCHING PROPERTY

Hisanobu Nakayama; Osamu Tanaka; Hiromichi Yasumoto; Seiichi Senoo; Youichi Zaizen, and Kouji Yamasaki, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 239,191
Claims priority, application Japan, Aug. 31, 1987, 62-215224; Aug. 31, 1987, 62-215225; Aug. 2, 1988, 63-193297
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—113 4 Claims

1. A method for producing grain-oriented electrical steel sheet having metallic luster and excellent punching property comprising the steps of decarbonization annealing, at a temperature of 800° to 850° C. and in an atmosphere whose rate of oxidation PH_2O/PH_2 is 0.25 to 0.55, a grain-oriented electrical steel sheet which has been cold rolled to a final thickness, coating the sheet with an annealing separator consisting of 100 parts by weight of magnesia blended with 2 to 40 parts of one or more chlorides of members selected from the group consist-

ing of Li, Na, K, Rb, Ca, Ba, Mg, and Sr, and finish annealing the sheet.

4,875,948

COMBUSTIBLE DELAY BARRIERS

Venkatesh R. P. Verneker, 8652 Concord Dr., Jessup, Md. 20794

Continuation-in-part of Ser. No. 36,660, Apr. 10, 1987, Pat. No. 4,824,495. This application Apr. 8, 1988, Ser. No. 179,325

Int. Cl.[4] C06B *45/14*

U.S. Cl. 149—15 13 Claims

1. A delay barrier comprising a combustible layer containing a mixture of fuel and oxidizer, a polymeric layer encompassing said combustible layer, and at least one metal layer disposed adjacent to a surface of the polymeric layer not in contact with the combustible layer.

4,875,949

INSENSITIVE BINDER FOR PROPELLANTS AND EXPLOSIVES

Indu B. Mishra, Churchville, and Lawrence J. Vande Kieft, Bel Air, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 18, 1988, Ser. No. 195,974

Int. Cl.[4] C06B *45/10*

U.S. Cl. 149—19.3 12 Claims

1. A novel polymer binder for explosives composed of poly (2-methyl-5-vinyl tetrazole), and a second polymer, of about 30%–50% by weight of the blend, selected from the group consisting of polyethylene glycol, polyvinyl acetate, polyvinyl alcohol, polymethyl methacrylate, polyvinylidene chloride and polyvinylidene fluoride.

4,875,950

EXPLOSIVE COMPOSITION

Kevin H. Waldock, Mt Thorley, and Daniel A. Wasson, Singleton, both of Australia, assignors to CBS Explosives Pty Limited, New South Wales, Australia

Filed Jun. 9, 1988, Ser. No. 204,370

Claims priority, application Australia, Jun. 10, 1987, PI2386; Nov. 18, 1987, PI5547

Int. Cl.[4] C06G *45/02*

U.S. Cl. 149—21 17 Claims

1. A dry mix explosive composition including a bulking agent, comprising from 1–20% (by weight) of a fibrous vegetable protein additive, said bulking agent having a bulk density of from 0.1–0.6 grams per cubic centimeter and said explosive composition having a bulk density of from 0.5–1.1 grams per cubic centimeter.

4,875,951

CHEMICAL FOAMING OF EMULSION EXPLOSIVE COMPOSITIONS

David W. Prest, Southport, England, and William J. Yorke, Quebec, Canada, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 2, 1989, Ser. No. 305,463

Claims priority, applicstion United Kingdom, Feb. 2, 1988, 8802209

Int. Cl.[4] D03D *23/00*; C06B *45/00*

U.S. Cl. 149—109.6 5 Claims

1. In a method of chemically foaming an emulsion explosive comprised of oxidizer salt, carbonaceous fuel, water and emulsifier wherein a gas generating material is admixed with the said emulsion explosive to react therein with the evolution of gas to foam the said emulsion explosive, the said gas generating material comprises a water-in-oil emulsion of an aqueous solution of sodium nitrite, a carbonaceous liquid and an emulsifier.

4,875,952

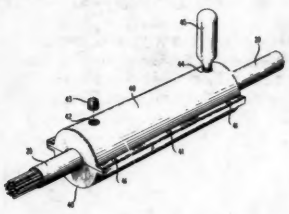
FORCED ENCAPSULATION MEANS FOR A CABLE

Francis J. Mullin, Chamblee, and William C. Reed, Lilburn, both of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 90,437, Aug. 26, 1987, abandoned, which is a continuation of Ser. No. 619,266, Jun. 11, 1984, abandoned. This application Feb. 8, 1988, Ser. No. 150,480

Int. Cl.[4] H01B *13/06*

U.S. Cl. 156—48 11 Claims



6. A method of enclosing a portion of at least one cable comprising

(a) forming expandable containment means around at least the portion of the cable, the containment means being secured to the cable and being adapted for receiving therein a liquid encapsulant;

(b) surrounding the containment means with substantially rigid outer enclosure means; and

(c) introducing a quantity of the liquid encapsulant into the containment means, the encapsulant being of a type whose viscosity increases with time until the encapsulant is no longer a liquid at room temperature; characterized in that the method further comprises

(d) pressurizing the encapsulant in the containment means to a first pressurize that is greater than ambient pressure, with the outer enclosure substantially restraining expansion of the containment means, and maintaining the liquid encapsulant under a pressure above ambient pressure for a time such that at least a part of the quantity of encapsulant is no longer a liquid at room temperature; and

(e) introducing the liquid encapsulant into the containment means through encapsulant-introduction means that are of a type that permits further introduction of liquid encapsulant into the containment means after introduction and pressurization of the quantity of liquid encapsulant.

4,875,953

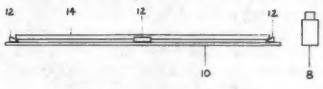
IMPRESSION PRINTING PROCESS FOR ANIMALS AND CHILDREN

Christopher A. Lloyd, P.O. Box 59, Twin Peaks, Calif. 92391

Filed Nov. 30, 1988, Ser. No. 278,672

Int. Cl.[4] B32B *31/00*; B44C *1/17*

U.S. Cl. 156—62 10 Claims



1. A process of transferring a printing medium from a printing medium coated member to a flexible recieving substrate

whereby an animal or child can create a unique impression print without coming into contact with the printing medium, comprising the following steps:

(a) coating a member with a printing medium;

(b) providing said flexible recieving substrate physically separated from the printing coated member by a supporting means comprising a frame, to maintain a physical separation between said recieving substrate and said printing coated member;

(c) selectively pressing areas of said flexible recieving substrate to stretch it and bring the substrate into print medium transfer contact with said printing coated member to transfer the printing medium in the areas to said receiving substrate.

4,875,954

METHOD AND APPARATUS FOR MANUFACTURING CARPET

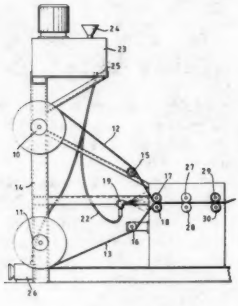
Colin Griffiths, Lisvane, and William G. Walker, Newport, both of Wales, assignors to Ebonwood Limited, Cardiff, Wales

Filed Feb. 29, 1988, Ser. No. 160,350

Claims priority, application United Kingdom, Feb. 28, 1987, 8704760

Int. Cl.[4] B32B *31/08, 31/12*

U.S. Cl. 156—64 **6 Claims**



1. A carpet manufacturing method comprising providing respective webs of material to form an upper layer and a base layer respectively, advancing and bringing together the webs into superimposed relationship, applying a hot-melt adhesive between the layers by means of at least one nozzle delivering the adhesive in an aerated diffuse spray pattern, immediately before the webs are brought together, and subsequently pressing the webs together and cooling them to cause them to adhere together.

4,875,955

METHOD AND APPARATUS FOR PREVENTING INSTALLATION IN AN AUTOMOBILE BODY OF A GLASS WINDOW PANEL HAVING OVERCURED ADHESIVE THEREON

Hiroshi Fujii, Hiroshima, Japan, assignor to Mazda Motor Manufacturing (USA) Corporation, Flat Rock, Mich.

Filed Aug. 31, 1988, Ser. No. 238,818

Int. Cl.[4] B23Q *17/00*; B05B *15/10*

U.S. Cl. 156—64 **20 Claims**

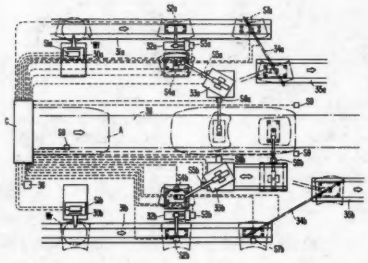
1. An apparatus for supplying and installing at least one glass window panel in an automobile body, comprising:

at least one conveyor means for supporting and conveying at least one glass window panel along a feed path;

at least one means along the feed path for applying adhesive to the glass window panel;

at least one transfer means downstream of the adhesive applying means for removing the glass window panel from the conveyor means and transferring the glass window panel to a position at which the glass window panel can be attached to an automobile body by being bonded thereto with the adhesive applied to the glass window panel by the adhesive applying means; and

control means including preventing means for preventing attachment of the glass window panel to the automobile body when the adhesive applied to the glass window panel has cured to at least a predetermined amount the control means including command means for controlling operation of the transfer means so that a glass window panel having adhesive thereon which has cured to at least the predetermined amount can be prevented from being



applied to the automobile body by preventing the transfer means from removing the glass window panel from the conveyor means, the preventing mean including timer means for outputting a first signal to the command means indicating when adhesive applied to the glass window panel has cured to at least the predetermined amount, the timer means including a timer which can be preset to a plurality of reference curing times, each of the reference curing times corresponding to a different adhesive curing condition selected from the group consisting of temperature of air exposed to the curing adhesive and humidity of air exposed to the curing adhesive.

4,875,956

METHOD OF BONDING PLASTICS

Tom S. Brackett, New Britain, Conn., assignor to Integrated Fluidics, Inc., Plainville, Conn.

Filed Oct. 6, 1987, Ser. No. 105,607

Int. Cl.[4] B32B *31/12*

U.S. Cl. 156—84 **6 Claims**

1. A method of producing a fluidic module from at least two pieces of acrylic material having an intermolecular bonded interface comprising the steps of:

a. heating in an absence of physical deformation to preshrink the acrylic pieces to obtain dimensional stability,

b. machining a first interface surface on the first piece and machining a second interface surface on the second surface, the interface surfaces conforming in shape to each other,

c. machining at least one fluidic passageway in the first interface surface,

d. removing burrs from the interface surface having the fluidic passageway,

e. polishing both interface surfaces,

f. assembling the pieces with the polished interface surfaces in contact with each other,

g. confining all external surfaces of the pieces against expansion, and

h. applying heat to the assembled pieces in an absence of

externally applied pressure to induce their expansion against their confinement to cause transmigration of mole-

cules from one interface surface to another to bond the pieces together.

4,875,957

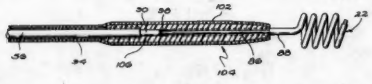
METHOD OF CONNECTING A NON-CONTAMINATING FLUID HEATING ELEMENT TO A POWER SOURCE

David R. Etheridge, 1733 Hiawatha Dr., Glendale, Calif. 91208

Continuation of Ser. No. 913,505, Sep. 29, 1986, Pat. No. 4,756,281. This application Jun. 30, 1988, Ser. No. 214,323

Int. Cl.[4] B32B *31/26*

U.S. Cl. 156—85 **10 Claims**



1. A method for forming a corrosion-resistant seal about a connection between a lead wire and a heating element for immersion within a purified fluid heating system, the steps comprising:

providing a resistance heating element which is covered with a layer of corrosion-resistant thermoplastic material;

providing a lead wire having at least a portion covered with a jacket of corrosion-resistant thermoplastic material;

forming an electrically conductive, low resistance connection between the heating element and the lead wire, wherein the connection is adjacent the jackets of corrosion-resistant thermoplastic material;

placing a sleeve of corrosion-resistant thermoplastic material about the connection between the heating element and the lead wire so that the sleeve overlaps at least portions of the jackets of corrosion-resistant thermoplastic material;

placing a thermocouple between the sleeve and th heating element;

surrounding the sleeve with thermally activated shrink tubing;

heating the thermoplastic materials surrounding the connection between the lead wire and the heating element; and

heating the shrink tubing, causing it to squeeze and fuse the thermoplastic materials together, such fusion creating a hermetic seal surrounding the connection between the lead wire and the heating element.

4,875,958

METHOD OF MAKING MOLDED SANITARYWARE ARTICLES WITH LIGHT TRANSMITTING PANEL

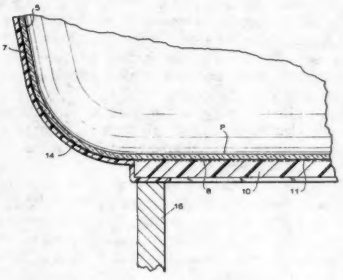
Masayuki Kurokawa, Tokyo, Japan, assignor to American Standard Inc., New York, N.Y.

Division of Ser. No. 5,814, Jan. 21, 1987, abandoned. This application Feb. 12, 1988, Ser. No. 155,407

Claims priority, application United Kingdom, Jan. 23, 1986, 8601617

Int. Cl.[4] B32B *31/04*; B05D *1/32*

U.S. Cl. 156—108 **7 Claims**



1. A method for making a molded article of sanitaryware comprising:

providing a sheet of light-transmitting plastic material and forming said material on a mold to produce a molded unreinforced shell in the shape of an article of sanitaryware of the type having a sump which is defined by side walls and a bottom wall having a drain opening therein;

applying a mask to at least a portion of one of said walls of said shell intended, in the finished article, to form a light-transmitting area;

coating the remaining shell area to make it effectively opaque; and

removing said mask to provide said at least one light-transmitting area and bonding a rigid panel of a light-transmitting plastic material in overlying relation to the outer surface of said light-transmitting area of said shell, thereby forming a support for said area.

4,875,959

TIRE FORMING METHOD AND APPARATUS

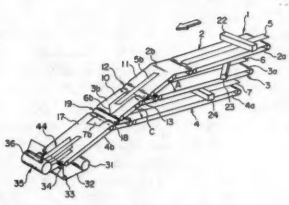
Yuzo Kumagai, Tokyo, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 24, 1987, Ser. No. 100,658

Claims priority, application Japan, Sep. 24, 1986, 61-225336

Int. Cl.[4] B29D *30/06*

U.S. Cl. 156—123 **3 Claims**



1. A tire forming method comprising the steps of; conveying on separate conveyors first and second different tire forming

members, said tire forming members having plural oblique reinforcing cords;

cutting said first and second different tire forming members to predetermined lengths and parallel to said oblique reinforcing cords while being conveyed on said separate conveyors;

after cutting, conveying said first and second tire forming members overlapping each other with leading portions thereof aligned in a substantially parallel, co-planar relation to each other, and with the leading portion of said second tire forming member being longitudinally displaced further downstream than that of said first tire forming member and then at a downstream point combining the leading portion of said first tire forming member upon said second tire forming member to form a pair of tire forming members with leading edge portions shifted longitudinally; wherein the leading portions of said tire forming members remain in substantially the same plane before and after said combining;

overlapping and combining said pair of tire forming members thus cut upon a third tire forming member with the leading portion of the third tire forming member shifted further downstream than said pair of tire forming members so that said pair of tire forming members are flush with said third tire forming member with said first, second and third tire forming member thus cut and combined being conveyed on a common conveyor, and

winding said member assembly thus formed on a winding roller.

4,875,960

APPARATUS AND METHOD FOR MANUFACTURING TUBULAR MEMBER

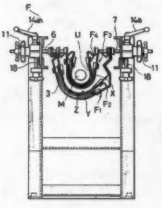
Tsutomu Shinomiya; Eichi Yoshino, both of Sapporo; Chihiro Maki, Saitama; Hitoshi Tojima, Kasukabe; Sadamu Izai, Iwatsuki; Akiro Nakata, Ageo, and Michiya Tamura, Iwatsuki, all of Japan, assignors to Hokkai Can Co., Ltd., Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 167,863

Claims priority, application Japan, Mar. 14, 1987, 62-57963; Mar. 23, 1987, 62-65813; Apr. 30, 1987, 62-104795; Jul. 3, 1987, 62-101777

Int. Cl.[4] B29D *23/10*

U.S. Cl. 156—203 **10 Claims**



1. An apparatus for manufacturing a tubular member by continuously supplying a plurality of elongate flexible webs while positionally displacing the webs in overlapping relation with side edges thereof arranged in a staircase configuration, progressively bending the webs along a mandrel, bonding the webs with adhesive layers interposed therebetween to form a tubular member, and joining the displaced side edges to complete the tubular member, said apparatus comprising: a device for continuously supplying the webs in mutually spaced-apart relation while longitudinally tensioning the webs; a plurality of resilient support plate members disposed respectively for the webs and arranged to lie along the lower surfaces of the webs transversely thereof, said support plate members having opposite ends positioned adjacent opposite side edges of the webs; a mandrel; devices supporting said opposite ends of the support plate members for moving said opposite ends vertically and toward and away from each other, said devices being capable of moving said opposite ends of the support plate members toward each other to curve the support plate members about an outer peripheral surface of said mandrel; and a positioning arrangement having a pair of guide members mounted on an inner surface of each of said support plate members for engaging opposite side edges of one of the webs.

4,875,961

HEAT-SENSITIVE TRANSFER MEDIUM

Hitoshi Oike, and Motoshige Yanagimachi, both of Kyoto, Japan, assignors to Oike Industrial Co., Ltd., Kyoto, Japan

Filed Oct. 7, 1987, Ser. No. 105,283

Claims priority, application Japan, Oct. 7, 1986, 61-238748; Oct. 14, 1986, 61-244735; Feb. 16, 1987, 62-32984

Int. Cl.[4] B41M *5/26*

U.S. Cl. 156—234 **31 Claims**

1. A heat-sensitive transfer medium for use in a printing method in which a heat transfer layer, provided on one surface of a support, is brought into contact with a receiving medium and localized areas of in ink layer are heated by means of a thermal head which is brought into contact with the other surface of the support, thereby transferring the heating areas of the transfer layer onto a receiving medium thereby forming printed images thereon, said transfer medium comprising a support and a transfer layer comprising at least a non-flowable, opaque ink layer, a metal deposition layer and an adhesive layer, said three layers being provided in that order from the support side of the medium, said transfer layer being capable of being transferred onto a receiving medium so that the localized areas of said layer that are heated by means of a thermal head are selectively transferred to form non-metallic printed images on the receiving medium said ink layer comprising a resin and a coloring agent and being substantially non-flowable under the transfer conditions, said metal deposition layer acting as a shading layer in the printed images.

4,875,962

METHOD FOR LAYING A SHEET OF MATERIAL ON A SURFACE

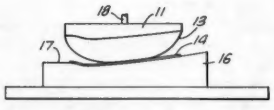
Colin J. Breakspear, Langport, England, assignor to Westland Group plc, England

Filed Dec. 2, 1987, Ser. No. 127,420

Claims priority, application United Kingdom, Dec. 8, 1986, 8629267

Int. Cl.[4] B32B *31/00*; B28B *7/32*

U.S. Cl. 156—245 **6 Claims**



1. A method for laying a sheet of pre-impregnated fibre-reinforced material onto a moulding surface, comprising the steps of:

providing an inflatable transfer tool having a flexible diaphragm attached to a periphery of the transfer tool,

picking up the sheet of pre-impregnated fibre-reinforced material on an external face of the flexible diaphragm,

locating the transfer tool so that said sheet is in contact with the moulding surface with diaphram deflated,

inflating the flexible diaphragm whereby a substantially uniform pressure is applied to force the sheet into contact with the moulding surface,

withdrawing the transfer tool from the moulding surface while maintaining the diaphragm inflated to cause the diaphragm to stretch under influence of the inflating pres-

sure so as to take up a varying curved shape as the transfer tool is withdrawn from the moulding surface whereby the diaphragm is peeled gradually from the external face of the sheet of material inwardly from its outer edge region, and

removing the transfer tool from the sheet of material.

4,875,963

PROCESS FOR PREPARING A TRANSFER METALLIZATION FILM

Klaus Paschke, Homburg-Reiskirchen; Guenther Crass, Taunusstein-Wehen, and Peter Dinter, Hallgarten, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 910,614, Sep. 23, 1986, abandoned. This application Jul. 18, 1988, Ser. No. 220,931

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1985, 3534398

Int. Cl.[4] B05D *3/06*; B32B *31/00*

U.S. Cl. 156—249 **16 Claims**

1. A process for preparing a transfer metallization film which is subsequently, metallized on one side, comprising the steps of: subjecting a film web having a first and second side and being comprised of predominantly propylene homopolymer to an electric corona discharge treatment on a first side of said only of said film web by guiding said film web over an electrode and subjecting said film web to electric corona discharge treatment by means of at least one counterelectrode on said first side of said film web facing said counterelectrodes; and subsequently metallizing the second side of the film web.

4,875,964

LIQUID MIXTURES BASED ON ETHYLENE POLYMERS, A PROCESS FOR PRODUCING THEM AND A COATING OR BONDING PROCESS IN WHICH THEY ARE USED

Hert Marius, Aubigny En Artois, France, assignor to Societe Chimique Des Charbonnages S.A., France

PCT No. PCT/FR86/00146, § 371 Date Dec. 16, 1986, § 102(e) Date Dec. 16, 1986, PCT Pub. No. WO86/06398, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 29, 1986, Ser. No. 942,384

Claims priority, application France, May 2, 1985, 85 06646

Int. Cl.[4] C09J *5/00*

U.S. Cl. 156—327 **13 Claims**

1. A process for bonding two substrates by means of an adhesive, characterized in that the adhesive is a liquid mixture consisting essentially of at least one ethylene polymer (A) and at least one solvent (B), wherein:

(a) the ethylene polymer (A) comprises at least one terpolymer with a flow index of between 2 and 500 dg/min, the terpolymer consisting essentially of:

from 83–95.7 mol% of units derived from ethylene,

from 4–15 mol% of units derived from at least one alkylacrylate or alkyl methyacrylate, the alkyl group containing 1 to 6 carbon atoms, and

from 0.3 to 2 mol% of units derived from maleic anhydride,

(b) the solvent (B) is chosen from aliphatic, alicyclic and aromatic hydrocarbons containing from 5 to 12 carbon atoms, esters and chlorinated solvents.

4,875,965

APPARATUS FOR FOLDING AND SEALING DOCUMENTS

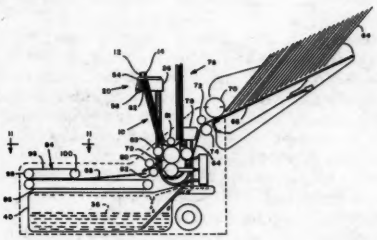
Joseph H. Marzullo, Danbury, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Oct. 30, 1987, Ser. No. 115,220

The portion of the term of this patent subsequent to Jan. 24, 2006, has been disclaimed.

Int. Cl.[4] B31F *1/00*

U.S. Cl. 156—442.1 **7 Claims**



1. Apparatus for folding and sealing seriatim a supply of documents into envelopes, each of said documents having a leading edge and containing a water-activated adhesive on a portion thereof, comprising:

a hopper for storing a supply of said documents;

first means for applying moisture to a portion of the documents;

a pair of folding rollers for imparting a fold to said documents, said folding rollers defining a nip therebetween;

a buckle chute for stopping the leading edge of said documents and causing said documents to enter the nip of said folding rollers, said buckle chute having one open end thereof;

second means mounted on said buckle chute for applying moisture to an interior portion of said documents;

a pair of ironing rollers located downstream of said folding rollers for maximizing adhesive contact of said documents; and

conveying/curing means located downstream of said ironing rollers for holding said envelopes together during transport prior to their release for further processing.

4,875,966

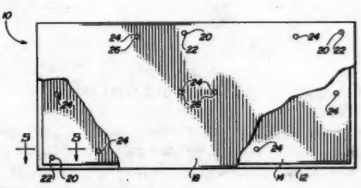
PRESSURE TRANSFER PLATE ASSEMBLY FOR A HEAT BONDING APPARATUS

Louis S. Perko, Rancho Cucamonga, Calif., assignor to General Dynamics Corp., Pomona Div., Pomona, Calif.

Filed Sep. 12, 1988, Ser. No. 242,580

Int. Cl.[4] B30B *7/00, 15/00*; B23Q *3/18*

U.S. Cl. 156—580 **15 Claims**



1. A pressure transfer plate assembly for use in a printed wiring board and flex harness heat bonding apparatus, comprising:

a bottom plate having a first plurality of holes therethrough

in a first predetermined pattern of locations and a second plurality of holes therethrough in a second predetermined pattern of locations, each of said second plurality of holes being internally threaded over a portion thereof;

a plurality of plug inserts having flat, parallel top and bottom surfaces, fitted into said first plurality of holes in said bottom plate, each said insert having a recess in said top surface;

a plurality of workpiece locating pins, each said pin having a base portion and an elongated body, with said base portion having been fitted into said recess of one of said plurality of inserts;

a plurality of quick-replacement plate alignment pins, each said quick-replacement pin having a head portion at one end thereof and a threaded portion at another end thereof, with said threaded portion having been screwed into one of said second plurality of holes in said bottom plate;

a top plate having a plurality of holes therethrough corresponding to said predetermined patterns of holes in said bottom plate, with said workpiece locating pins and said quick-replacement plate alignment pins extending into said holes in said top plate; and

a plurality of thin liners, each said liner having a plurality holes therethrough corresponding to said predetermined patterns of holes in said bottom plate, said liners being disposed between said top and bottom plates to separate distinct assembled workpieces during heat bonding.

4,875,967

METHOD FOR GROWING A SINGLE CRYSTAL OF CUBIC BORON NITRIDE SEMICONDUCTOR AND METHOD FOR FORMING A P-N JUNCTION THEREOF, AND LIGHT EMITTING ELEMENT

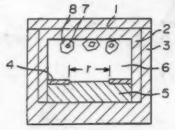
Osamu Mishima; Shinobu Yamaoka; Osamu Fukunaga; Junzo Tanaka, and Koh Era, all of Tsukuba, Japan, assignors to National Institute for Research in Inorganic Materials, Tsukuba, Japan

Filed Mar. 7, 1988, Ser. No. 164,898

Claims priority, application Japan, May 1, 1987, 62-109523; May 1, 1987, 62-109524

Int. Cl.[4] C30B *9/04, 19/02, 29/38*

U.S. Cl. 156—605 **11 Claims**



1. A method for growing a single crystal of cubic boron nitride semiconductor in a growing container sealed under high pressure and high temperature conditions, which comprises dissolving in a dopant-containing boron nitride solvent a boron nitride starting material placed at a high temperature zone in the growing container, and providing a temperature gradient to the solvent so that the temperature dependence of the solubility is utilized to let the single crystal form and grow at a low temperature zone in the growing container, the amount of the dopant present being effective to provide for a specific reaistance of from 1 to 10^5 Ω. cm.

4,875,968

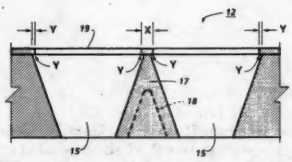
METHOD OF FABRICATING INK JET PRINTHEADS

James F. O'Neill, Penfield; Donald J. Drake, Rochester, and William G. Hawkins, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 2, 1989, Ser. No. 305,046

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—633 **9 Claims**



1. An improved method of fabricating a thermal ink jet printhead of the type produced by the mating of an anisotropically etched silicon substrate containing ink flow directing recesses with a substrate having heating elements and addressing electrodes, so that selective application of electrical pulses to the heating elements expel ink droplets from the printhead, wherein the improved method comprises the steps of:

(a) patterning an etch resistant material on one surface of a (100) silicon substrate to form at least two sets of vias therein having predetermined sizes, shapes, and predetermined spacing therebetween, said predetermined spacing permitting selected complete undercutting by an anisotropic etchant within a predetermined etching time period; and

(b) anisotropically etching the patterned silicon substrate with the patterned etch resistant material for said predetermined time period to form at least two sets of separate recesses, each recess being separated from each other by a wall, the surfaces of said walls being {111} crystal planes of the silicon substrate, whereby certain predetermined separately etched recesses in one of said sets are selectively placed into communication with each other by the selective undercutting of their common wall, while the reminder of the undercut walls provide strengthening reinforcement to the printhead, so that larger printheads may be fabricated which are more robust without relinquishing resolution or reducing tolerances.

4,875,969

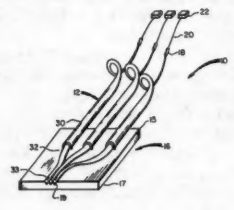
METHOD OF MAKING A FIBER OPTIC ARRAY

Kevin Hsu, Atlanta, Ga.; Srinivas T. Rao, Los Gatos, Calif., and Joseph Y. Kaukeinen, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 7, 1988, Ser. No. 254,756

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—633 **7 Claims**



1. A method of making a fiber optic array comprising the steps of:

forming a plurality of grooves in a substrate, said grooves extending to a first end of the substrate;

removing a portion of cladding from one end of a plurality of optical fibers to form fibers in which said one end has cladding of a reduced outside dimension relative to the outside dimension of the cladding at an opposite end of the fibers;

placing said fibers in said grooves such that all of the fibers extend in generally the same direction, the ends of the fibers having the reduced dimension being placed in grooves adjacent said first end of said substrate; and

cementing the fibers in the grooves.

4,875,970

METHOD OF FORMING RECESSED PROFILE ON FERRITE SINGLE CRYSTAL BY CHEMICAL ETCHING

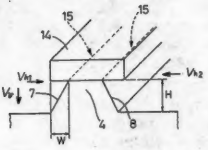
Fuminori Takeya, Nagoya; Naoya Fukuda, Aichi, and Miki Suzuki, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Dec. 29, 1988, Ser. No. 291,648

Claims priority, application Japan, Mar. 29, 1988, 63-75744

Int. Cl.[4] B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—645 **15 Claims**



1. A method of forming a recessed portion on a surface of a Mn-Zn ferrite single crystal, said recessed portion having a predetermined cross sectional profile and at least one straight ridge each of which defines a boundary in said profile, comprising the steps of:

forming an etching mask on the surface of said ferrite single crystal, so as to provide said recessed portion by etching such that said at least one straight ridge lies in a (100) or (110) plane of said ferrite single crystal which is perpendicular to said surface; and

exposing said ferrite single crystal with said etching mask to an aqueous solution which substantially consists of water, the balance consisting principally of phosphoric acid, thereby chemically etching said surface of the ferrite single crystal, to produce said recessed portion such that an inclined surface is formed so as to extend parallel to said straight ridge and such that said straight ridge defines an edge of said inclined surface.

4,875,971

FABRICATION OF CUSTOMIZED INTEGRATED CIRCUITS

Zvi Orbach, and Meir I. Janai, both of Haifa, Israel, assignors to Elron Electronic Industries, Ltd., Haifa, Israel

Filed Mar. 23, 1988, Ser. No. 172,235

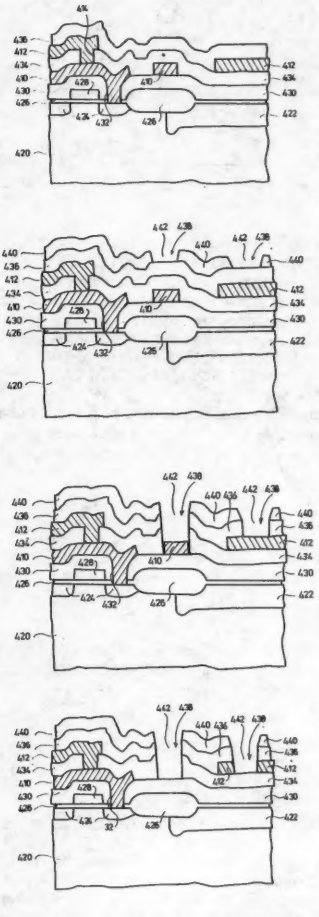
Claims priority, application Israel, Apr. 5, 1987, 82113

Int. Cl.[4] B44C *1/22*; C23F *1/02*; C03C *15/00*; H01L *21/306*

U.S. Cl. 156—644 **50 Claims**

1. A technique for production of customized integrated circuit gate arrays comprising the steps of:

providing an integrated circuit gate array blank having at least a first metal layer and a second metal layer formed over said first metal layer and separated therefrom by an insulator, said first and second metal layers including



portions arranged for selectable removal to provide desired customization of said integrated circuit blank; and thereafter

etching at least said first metal layer to customize said integrated circuit gate array blank.

4,875,972

HYDROGEN PEROXIDE COMPOSITIONS CONTAINING A SUBSTITUTED OXYBENZENE COMPOUND

Rodney K. Williams, Stacy; Bruce A. Bohnen, Roseville, and Kurt E. Heikkila, Circle Pines, all of Minn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

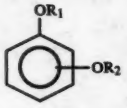
Filed Jul. 27, 1988, Ser. No. 224,802

Int. Cl.[4] C09G *13/06*; C23G *1/18*

U.S. Cl. 156—664 **6 Claims**

1. A stabilized hydrogen peroxide composition comprising hydrogen peroxide and a substituted oxybenzene compound

which is soluble in hydrogen peroxide wherein the compound is of the formula



wherein R_1 and R_2 independently are a C_1 and C_{12} straight or branched alkyl chain group.

4,875,973

HYDROGEN PEROXIDE COMPOSITIONS CONTAINING A SUBSTITUTED AMINOBENZALDEHYDE

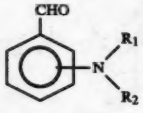
Kurt E. Heikkila, Circle Pines; Rodney K. Williams, Stacy, and Bruce A. Bohnen, Roseville, all of Minn., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Jul. 27, 1988, Ser. No. 224,801

Int. Cl.[4] C09G *13/06*; C23G *1/18*

U.S. Cl. 156—664 **6 Claims**

1. A stabilized hydrogen peroxide composition comprising hydrogen peroxide and a substituted aminobenzaldehyde compound which is soluble in hydrogen peroxide wherein the compound is of the formula:



and each R_1 and R_2 is independently of the other $C_{1\text{-}12}$ linear or branched chain alkyl group or a C_5 or C_6 saturated or unsaturated cyclic group.

4,875,974

ABSORBENT VEGETABLE MATERIAL AND PROCESS FOR MAKING SAME

Thomas F. Rich, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 522,873, Aug. 11, 1983, abandoned. This application Jan. 20, 1988, Ser. No. 146,059

Int. Cl.[4] D21C *5/00*

U.S. Cl. 162—10 **9 Claims**

1. An absorbent material derived from a vegetable material containing at least about 15% pectin, said absorbent material comprising:

(a) from about 15% to about 60% pectin, said pectin having a degree of esterification of from about 1% to about 45%, and from 18.5% to about 50% of the pectin being in the form of a divalent metal salt;

(b) from about 15% to about 80% of a material selected from the group consisting of cellulose, hemicellulose, lignin and mixtures thereof;

(c) from 0% to about 1% chloroform soluble lipids;

(d) from 0% to about 10% non-lipid organic materials extractable in a mixture of chloroform, methanol and water, said mixture having a volume ratio chloroform:methanol:-water of 20:4:1; and

(e) from 0% to about 6% water-soluble metal salts.

4,875,975

DEVICE FOR DRAWING AN ENDLESS BELT INTO A PAPER MAKING MACHINE

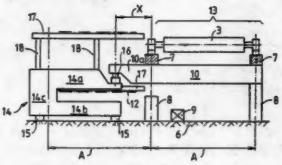
Christian Schiel, Heidenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,183

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737584

Int. Cl.[4] D21F *1/24*

U.S. Cl. 162—273 **17 Claims**



1. A device for enabling the drawing in of an endless belt into a machine, comprising:

a frame for the machine, the machine frame having a draw-in side onto and over and past which the belt is drawn in and an opposite side toward which the belt is moved as the belt is drawn in;

a plurality of rolls supported at the frame between the slides of the frame over which the endless belt travels;

at the draw-in side of the frame, a support for the frame; and the frame having a roll supporting part which is supported on the frame support; the frame support being changeable for providing an open region along the height of the frame support through which the endless belt may be drawn in over the frame;

the frame having at least one cantilever piece which extends beyond the frame support at the draw-in side and extends beyond the draw-in side of the frame for a first distance;

an auxiliary support located at the draw-in aide of the frame and being relatively moveable with respect to the frame; the auxiliary support including means for supporting the belt that is to be drawn-in off the auxiliary support and onto the frame between the sides of the frame; the auxiliary support further comprising a cantilever arm having a free end that extends toward the draw-in side of the machine frame for a second distance; the length of the cantilever arm of the auxiliary support and the length of the cantilever piece of the frame are respectively selected such that with the auxiliary support placed at the draw-in side of the frame, the cantilever arm of the auxiliary support is positioned for and includes means for providing support to the cantilever piece of the frame during the draw-in of the belt off the auxiliary support onto the frame; the auxiliary support being emplaceable next to the draw-in side of the frame for the cantilever arm to provide support to the cantilever piece and being removable away from the draw-in of the frame;

the device being dimensioned such that the sum of the first and second distances approximates the length of the width of the frame between the sides thereof.

4,875,976

TRANSFER APPARATUS FROM PRESS SECTION TO DRYING SECTION

Gregory L. Wedel, Beloit, Wis., assignor to Beloit Corporation, Beoit, Wis.

Filed Sep. 27, 1988, Ser. No. 249,798

Int. Cl.[4] D21F *11/00*; F26B *13/10*

U.S. Cl. 162—306 **2 Claims**

1. A transfer apparatus for transferring a web from a press

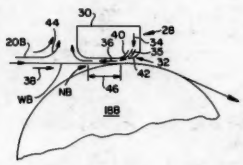
section to a first dryer of a dryer section, said apparatus comprising:

a lead-in roll disposed closely adjacent to the press section;

a felt having a direction of movement and extending around said lead-in roll and from said lead-in roll to the first dryer such that the web extends in an open draw from the press section to said lead-in roll and is thereafter supported by and beneath said felt towards a dryer nip defined between said felt and the first dryer;

vacuum generating means disposed adjacent to said dryer nip such that the web and said felt are disposed between said means and the first dryer, the web being disposed between said felt and the first dryer, said means inducing a partial vacuum adjacent to said nip between said felt and the web so that wrinkling and breakage of the web as the web approaches said nip is inhibited;

said vacuum generating means being a blow box which defines a slot that extends in a cross-machine direction across the width of said felt structured so that air flows from within said blow box through said slot in a direction



substantially parallel to and opposite to the direction of movement of said felt for inducing said partial vacuum between said felt and the web;

said partial vacuum being induced from said nip to a distance upstream relative to said nip within the range 4 to 10 inches;

said slot having a first and a second lip, said first lip having a curved configuration such that air within said blow box flows in a direction initially radially towards the first dryer and then curves in a direction to follow said first lip due to the Coanda effect and thereafter follows a direction substantially parallel to and opposite to the direction of movement of said felt so that a partial vacuum is generated between said blow box and said felt which in turn induces said partial vacuum between said felt and the web; and

said flow of air in a direction parallel and opposite to the direction of movement of said felt deflecting boundary layer air that follows said felt from said lead-in roll towards said blow box thereby augmenting said partial vacuum induced between said felt and the web in the vicinity of said nip.

4,875,977

HORIZONTAL TWIN WIRE MACHINE WITH VERTICALLY ADJUSTABLE OPEN ROLL AND DEFLECTOR BLADE

Richard W. Creagan, Kirkland, and Alan J. Nicol, St. Lazare, both of Canada, assignors to The Black Clawson Company, Middletown, Ohio

Continuation-in-part of Ser. No. 39,500, Apr. 17, 1987, Pat. No. 4,724,047. This application Jan. 15, 1988, Ser. No. 144,842

The portion of the term of this patent subsequent to Jul. 30, 2002, has been disclaimed.

Int. Cl.[4] D21F *1/36, 1/00*

U.S. Cl. 162—300 **19 Claims**

1. Apparatus for forming paper which includes a main frame, means mounted on said frame for supporting a generally horizontal run of a primary endless forming wire, which run has an upstream end and a downstream end, and means for delivering a flow of paper making stock to said upstream end of said wire run for drainage therethrough to form a paper sheet thereon while traveling thereon toward the other end of said run, comprising:

(a) a supplemental frame assembly mounted above said main frame,

(b) means including an upstream roll and a downstream roll mounted in spaced relation on said frame assembly above said primary wire run and supporting a run of a top endless forming wire above said primary wire run,

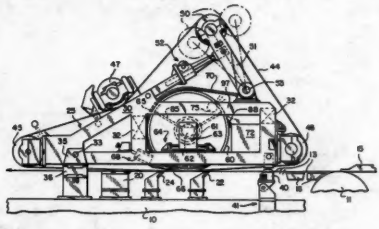
(c) a pair of wire deflectors positioned below and in supporting relation with said primary wire run and in spaced relation with each other lengthwise of said main frame wherein they define a gap therebetween across which said primary wire run travels,

(d) a third roll having an open face mounted for rotation within the loop of said top wire between said upstream and downstream rolls and with the vertical center line thereof intermediate said pair of primary wire deflectors to receive and guide a run of said top wire directly from said upstream roll,

(e) means for driving said top wire and said third roll in the same direction as said primary wire,

(f) a top wire deflector blade mounted within said top wire loop and having an edge thereof positioned to engage said top wire at a location within said gap spaced between the vertical center line of said third roll and the downstream one of said pair of primary wire deflectors,

(g) means for adjusting the vertical positions of said third roll with respect to said main frame over a range which includes positions of the lower periphery thereof that are



below a horizontal plane defined by said primary wire deflectors said adjusting means being structured and arranged such that said third roll will guide said top wire run downwardly from said upstream roll into such converging relation with said primary wire run that said primary and top wire runs define a wedge zone leading to and immediately upstream from the surface of said third roll and having the apex thereof located in said gap,

(h) means for adjusting said top wire deflector blade with respect to said main frame and with respect to said third roll over a vertical range which includes positions thereof that are at lower levels than said horizontal plane defined by said primary wire deflectors to vary the pressure exerted by said blade on the converged wires traveling from said third roll to said downstream one of said pair of wire deflectors,

(i) a shield mounted in upwardly extending relation from said top wire deflector blade and in facing and enclosing relation with a predetermined portion of said third roll,

(j) the relative dimensions and positioning of said shield and said third roll establishing a partial channel therebetween having a lower end thereof positioned to receive liquid directed upwardly from the inner surface of said top wire by said top wire deflector blade whereby such liquid is guided by said shield around said portion of the outer surface of said roll faced by said shield and is discharged centrifugally from an upper end of said channel, and

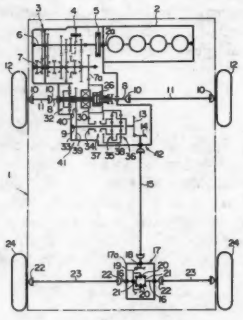
(k) means defining a receptacle for receiving liquid discharged from the upper end of said channel.

4,875,978

VEHICLE FOUR WHEEL DRIVE SYSTEM

Manabu Hiketa, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 18, 1987, Ser. No. 86,479
Claims priority, application Japan, Aug. 20, 1986, 61-194940
Int. Cl.[4] B60K 17/344
U.S. Cl. 180—248 8 Claims



1. A motor vehicle having a body,

front and rear wheels respectively provided in front and rear portions of the body,

a power transmitting mechanism including transmission means having an input member and an output member arranged in a transverse direction of the body,

first drive axle means arranged in a transverse direction of the body and connected with one of the front and rear wheels for transmitting a rotation to said one of the front and rear wheels,

second drive axle means arranged in a transverse direction of the body and connected with the other of the front and rear wheels for transmitting a rotation to said other of the front and rear wheels,

a transfer shaft arranged to extend in a transverse direction of the body and provided with torque splitting means for transmitting a driving torque from the transmission means to said first and second drive axle means with a predetermined torque splitting ratio,

said torque splitting means including a plurality of inter-axle differential gear mechanisms having different torque splitting ratios and selecting means for selectively operating one of said differential gear mechanisms to establish a desired torque splitting ratio between the first and second drive axle means,

said transfer shaft being located adjacent to said first drive axle means,

said first drive axle means carrying an idle gear which is in engagement with an output member of said transmission means and an input member of said torque splitting means,

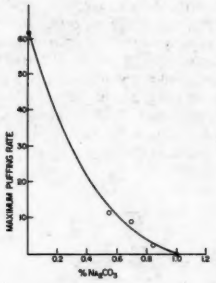
said idle gear being of a larger diameter than said input member of said torque splitting means so that rotation speed is increased between said idle gear and said input member of the torque splitting means.

4,875,979

TREATMENT OF PETROLEUM COKES TO INHIBIT COKE PUFFING

Thomas H. Orac, Strongsville; Herbert C. Quandt, Lakewood, and David R. Ball, Bay Village, all of Ohio, assignors to Union Carbide Corporation, Danbury, Conn.

Filed Mar. 7, 1988, Ser. No. 164,749
Int. Cl.[4] C10B 57/00; C01B 31/04
U.S. Cl. 201—5 23 Claims



1. A process for treating high sulfur petroleum coke particles which comprises:

reacting said petroleum coke particles in the absence of a binder with a compound containing an alkali metal selected from the group consisting of sodium and potassium at an elevated temperature above that at which said compound begins to react with carbon but below the temperature at which said coke particles would begin to puff in the absence of said compound;

maintaining said coke particles and said compound at said elevated temperature for a sufficient period of time to permit the reaction to proceed and to allow products of the reaction to penetrate said coke particles and form a sodium or potassium-containing deposit throughout the mass of said particles; and

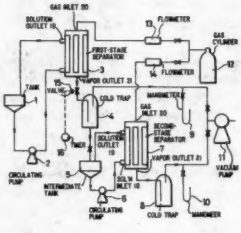
cooling the so-treated coke particles.

4,875,980

METHOD FOR SEPARATING AND CONCENTRATING AN ORGANIC COMPONENT FROM AN AQUEOUS SOLUTION CONTAINING SAME

Masujiro Arita, Tokyo, and Yukinobu Sugimoto, Yokohama, both of Japan, assignors to Mitsubishi Rayon Engineering Co., Ltd. and Mitsubishi Rayon Co., Ltd., both of Tokyo, Japan

Filed Aug. 26, 1987, Ser. No. 89,448
Claims priority, application Japan, Sep. 2, 1986, 61-206238
Int. Cl.[4] B01D 13/00
U.S. Cl. 203—14 19 Claims



1. A method for separating and concentrating an organic

component having a lower boiling point then water from an aqueous solution containing said organic component, which comprises the steps of:

(i) contacting said aqueous solution containing said organic component having a lower boiling point than water with a major surface of a hydrophobic porous membrane;

(ii) exposing another major surface of said hydrophobic porous membrane opposite to said aqueous solution to a vacuum to obtain a first vapor having a higher concentration of said organic component than said aqueous solution;

(iii) liquifying said first vapor to obtain a first concentrated solution having a higher concentration of said organic component when said aqueous solution;

(iv) contacting said first concentrated solution with a major surface of a hydrophobic nonporous membrane; and

(v) exposing another major surface of said hydrophobic nonporous membrane opposite to said first concentrated solution to a vacuum to obtain a second vapor having a higher concentration of said organic component than said first vapor.

4,875,981

OXYGEN ANALYZING METHOD AND DEVICE

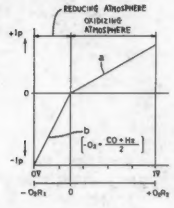
Jun Usami, Aichi; Akinobu Hattori, Yokkaichi, and Yuichi Sasaki, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Apr. 6, 1987, Ser. No. 34,903

Claims priority, application Japan, Apr. 9, 1986, 61-81577

Int. Cl.[4] G01N *27/58*

U.S. Cl. 204—1 T **7 Claims**



1. An oxygen analyzing method for determining a positive or negative oxygen concentration of a measurement gas which changes at random between an oxidizing atmosphere and a reducing atmosphere, comprising the steps of:

providing an electrochemical oxygen sensing cell wherein an electromotive force is induced according to the principle of an oxygen concentration cell, between a measuring electrode exposed to said measurement gas, and a reference electrode exposed to a reference gas;

providing an electrochemical oxygen pumping cell adapted to effect an electrochemical oxygen pumping action for controlling an atmosphere adjacent to said measuring electrode of said sensing cell;

providing a heater which cooperates with said sensing and pumping cells to form an integral laminar oxygen sensing element, and which is energized to heat said sensing and pumping cells;

controlling said heater so as to maintain an operating temperature of said sensing and pumping cells within a range of 700°–960° C.;

producing a pump control signal for controlling a pumping current to be applied to said pumping cell, to control the atmosphere adjacent to said measuring electrode so that said electromotive force induced between said measuring and reference electrodes is equal to a predetermined level; and

converting the controlling pumping current or the produced pump control signal, into an oxygen concentration signal whose level is held within one of a positive range and a negative range, said converting being performed according to a stored predetermined relationship between a value said pumping current or said pump control signal and said level of said oxygen concentration signal, said predetermined relationship consisting of a first relationship between a positive value of said pumping current or pump control signal and said positive or negative range of said level of the oxygen concentration signal, and a second relationship between a negative value of said pumping current or pump control signal and said positive or negative range of said level of the oxygen concentration signal, said second relationship being determined according to the equation $-O_2=(CO+H_2)/2$, wherein $-O_2$ represents the oxygen concentration of said measurement gas, and CO and H_2 represent known concentration values of a simulation atmosphere, said oxygen concentration signal representing said positive oxygen concentration of said measurement gas where the measurement gas is in a state of said oxidizing atmosphere, or said negative oxygen concentration of said measurement gas where the measurement gas is in a state of said reducing atmosphere.

5. An oxygen analyzing device for determining a positive or negative oxygen concentration of a measurement gas whcih changes at random between an oxidizing atmosphere and a reducing atmosphere, comprising:

an electrochemical oxygen sensing element including (a) an electrochemical oxygen sensing cell having a measuring electrode exposed to said measurement gas, and a reference electrode exposed to a reference gas, wherein an electromotive force is induced between said measuring and reference electrodes, according to the principle of an oxygen concentration cell, (b) an electrochemical oxygen pumping cell operable to effect an electrochemical oxygen pumping action for controlling an atmosphere adjacent to said measuring electrode of said sensing cell, (c) diffusion-resistance means through which said measurement gas diffuses toward said measuring electrode, under a predetermined diffusion resistance, and (d) a heater for heating said sensing and pumping cells;

a heater controller for controlling said heater so as to maintain an operating temperature of said sensing and pumping cells within a range of 700°–960° C.;

a pumping-current controller which produces a pump control signal for controlling a pumping current to be applied to said pumping cell, to control the atmosphere adjacent to said measuring electrode so that said electromotive force induced between said measuring and reference electrodes is equal to a predetermined level;

a converter for converting the controlled pumping current or the produced pump control signal, into an oxygen concentration signal whose level is held within one of a positive range and a negative range, said oxygen concentration signal representing said positive oxygen concentration of said measurement gas where the measurement gas is in a state of said oxidizing atmosphere, or said negative oxygen concentration of said measurement gas where the measurement gas is in a state of said reducing atmosphere; and

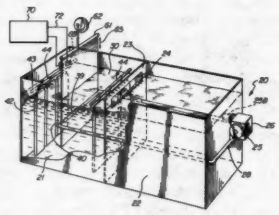
said converter including means for storing a predetermined relationship between a value of said pumping current or said pump control signal and said level of said oxygen concentration signal, said predetermined relationship consisting of a first relationship between a positive value of said pumping current or pump control signal and said positive or negative range of said level of the oxygen concentration signal, and a second relationship between a negative value of said pumping current or pump control signal and said positive or negative range of said level of the oxygen concentration signal, said second relationship being determined according to the equation $-O_2=-(CO+H_2)/2$, wherein $-O_2$ represents the oxygen concentration of said measurement gas, and CO and H_2 represent known concentration values of a simulation atmosphere.

4,875,982

PLATING HIGH ASPECT RATIO HOLES IN CIRCUIT BOARDS

Larry N. Velie, El Toro, Calif., assignor to Velie Circuits, Inc., Costa Mesa, Calif.

Filed Feb. 6, 1987, Ser. No. 11,887
Int. Cl.[4] C25D *5/02, 17/00*
U.S. Cl. 204—14 26 Claims



1. A product by process comprising an electrically-conductive coating on a printed circuit substrate of dielectric material, said substrate having therein high aspect ratio holes plated to an essentially uniform thickness by the process steps of:

(a) precoating a thin, uniform electrically-conductive layer over the surface of said dielectric printed circuit substrate,

(b) energizing said precoated printed circuit substrate with a plating current,

(c) submerging said energized substrate in an electrolyte bath,

(d) submerging manifolds in said electrolyte bath such that the manifolds are spaced and offset from one another,

(e) connecting each of the manifolds to a negative pressure source, and

(f) vacuum washing opposite sides of the printed circuit substrate in order to suction the electrolyte through the high aspect ratio holes in the substrate; and

(g) moving the substrate relative to and between said spaced and offset manifolds while the suction of the offset manifolds is drawing the electrolyte through the high aspect ratio holes and thereby plating the holes to an essentially uniform amount.

4,875,983

PROCESS FOR CONTINUOUS ELECTRODEPOSITION OF CHROMIUM METAL AND CHROMIUM OXIDE ON METAL SURFACES

Santa Alots; Vincenzo Ferrari; Massimo Memmi; Leonardo Pacelli, and Susanna Ramundo, all of Rome, Italy, assignors to Centro Sviluppo Materiali SpA, Rome, Italy

Filed May 17, 1988, Ser. No. 195,958
Claims priority, application Italy, May 13, 1987, 47918 A/87
Int. Cl.[4] C25D *3/06, 7/06*
U.S. Cl. 204—28 9 Claims

1. Process for continuous electrodeposition of chromium metal and trivalent chromium oxide on metal surfaces, in which a continuous metal body is continuously immersed in an electrolyte, that is strongly acid due to the presence of chromic acid, contained in at least one electrolytic cell in which said metal body acts as cathode, characterized in that said metal body is subjected to an electrolytic cathodic treatment comprising at least three successive pulses of current with a density of at least 50 A/dm^2, while it is immersed in said electrolyte that has a pH of less than 3 and a velocity of over 0.5 m/s.

4,875,984

METHOD FOR MANUFACTURING ELECTROLYTICALLY CHROMATED STEEL SHEET

Hiroki Iwasa; Toyofumi Watanabe, and Hirohide Furuya, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 309,683
Claims priority, application Japan, Feb. 27, 1988, 63-45419
Int. Cl.[4] C25D *11/38*
U.S. Cl. 204—56.1 3 Claims

1. A method for manufacturing an electrolytically chromated steel sheet, comprising the steps of:

anodically treating a steel sheet at a current density of from 0.3 to 20 coulomb/dm^2 in an acidic aqueous electrolyte containing at least one of chromic anhydride, chromate and bichromate, to form a hydrated chromium oxide film having numerous holes and numerous thin portions over the entire area of at least one surface of said steel sheet; and then

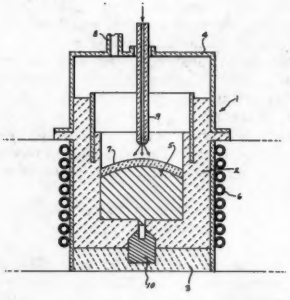
cathodically treating said anodically treated steel sheet in an acidic aqueous electrolytic chromating solution to form on said at least one surface of said steel sheet a chromate film comprising a metallic chromium layer as a lower layer having thereon numerous granular projections corresponding to said numerous holes and said numerous thin portions, and a hydrated chromium oxide layer as an upper layer formed on said metallic chromium layer.

4,875,985

METHOD AND APPPARATUS FOR PRODUCING TITANIUM

Raymond J. Donahue, Fond du Lac; William G. Hesterberg, Rosendale, and Terrance M. Cleary, Allenton, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Oct. 14, 1988, Ser. No. 258,035
Int. Cl.[4] C25C *3/28*
U.S. Cl. 204—64 T 27 Claims



1. A method of producing titanium, comprising the steps of heating a quantity of titanium to a temperature above the melting point thereof to produce a melt, providing a layer of a slag containing an ionized titanium compound and slag constituents on the top of said melt, heating said slag to a molten state by direct current plasma arc heating with said melt being

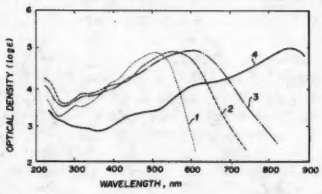
anodic, and reversing the polarity of said plasma arc heating with said melt being cathodic to reduce said titanium compound at the interface between said slag and said melt to produce titanium, said titanium being combined with said melt.

4,875,986

METHOD FOR THE PREPARATION OF POLYKIS-AZOBENZENES

Akira Yabe; Akihiko Ouchi; Hiroshi Moriyama, all of Tsukuba, and Etsuro Masuda, Suginami, all of Japan, assignors to Japan as represented by Director General of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 1, 1988, Ser. No. 162,728
Claims priority, application Japan, Mar. 13, 1987, 62-58236
Int. Cl.[4] B01J *19/00*
U.S. Cl. 204—157.6 7 Claims



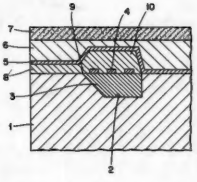
1. A method for the preparation of polykis-azobenzenes which comprises irradiating a substituted or unsubstituted 1,4-diazidobenzene with light.

4,875,987

GROOVED MAGNETIC SUBSTRATES AND METHOD FOR PRODUCING THE SAME

Toshiaki Wada, Takatsuki; Yoshiaki Katsuyama, Muro, and Junichi Nakaoka, Amagasaki, all of Japan, assignors to Sumitomo Special Metals, Co., Ltd., Osaka, Japan

Division of Ser. No. 888,873, Jul. 24, 1986, Pat. No. 4,777,074.
This application Jun. 29, 1988, Ser. No. 213,234
Claims priority, application Japan, Aug. 12, 1985, 60-177430; Aug. 26, 1985, 60-188175
Int. Cl.[4] G11B *5/42*; C23C *14/34*
U.S. Cl. 204—192.15 12 Claims



1. A method for producing grooved magnetic substrate including the steps of:

(a) depositing alumina particles into at least one parallel groove having a ratio of depth (d)/width (w) of 1 or lower defined in a surface of a magnetic substrate by means of sputtering to form an alumina film layer which fills the groove under the conditions that said alumina film layer has a Knoop hardness of 600 kg/mm^2 to 1200 kg/mm^2 which is equal to or higher than the magnetic substrate, and

(b) applying precision machining to the thus deposited alumina film until said groove is exposed and a step-like surface irregularity of said substrate relative to said alumina film layer reaches 200 Å or lower is obtained, thereby forming said alumina film layer charged in said groove.

4,875,988

ELECTROLYTIC CELL

Pedro J. Aragon, 306 Highpoint Dr., Wadsworth, Ohio 44281

Filed Aug. 5, 1988, Ser. No. 229,603
Int. Cl.[4] C25B *9/00, 11/03, 13/06, 13/08*
U.S. Cl. 204—265 12 Claims

1. An improved electrolytic cell of the type having a catholyte compartment, an anolyte compartment, a flat cathode electrode, a flat anode electrode, and a separator located between the anode and the cathode electrodes, wherein the improvement comprises:

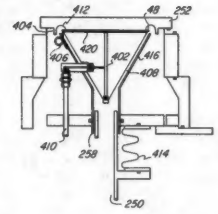
(a) a separation chamber located at the top and being an integral part of said anolyte compartment crossing a separator plane between said anode and cathode compartments to occupy a space available over said catholyte compartment and being flush to a plane of a back surface of said catholyte compartment to separate gas produced during the electrolysis from expent anolyte solution, and having at least one outlet for removal of anodic gases produced during electrolysis, and at least one inlet for receiving gases originated from outside of said electrolytic cell.

4,875,989

WAFER PROCESSING APPARATUS

Cecil J. Davis, Greenville; Robert T. Matthews; Lee M. Loewenstein, both of Plano; Joe V. Abernathy, Wylie, and Timothy A. Wooldridge, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 5, 1988, Ser. No. 283,036
Int. Cl.[4] C23C *14/34*; C23F *1/02*
U.S. Cl. 204—298 18 Claims



1. An apparatus for processing of wafers comprising:

(a) a vacuum processing chamber;

(b) a wafer support within said vacuum processing chamber, said wafer support being capable of supporting a wafer;

(c) an edge directing gas distribution device comprising a

funnel-shaped distributor and a conical baffle concentrically positioned within said distributor to form an annulus for selectively directing the flow of process gases toward the circumference of the wafer;

(d) a device for generating free radicals which is remote from said processing chamber and supplying the free radicals to the gas flow direction device;

(e) a heating device within said vacuum processing chamber; whereby photoresist beads near the edge of the wafer can be selectively etched away.

4,875,990

OXYGEN CONCENTRATION MEASURING DEVICE

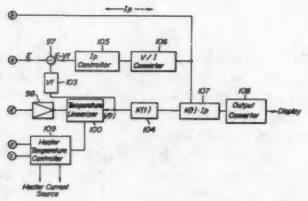
Toru Kodachi, Nagoya, and Jun Usami, Aichi, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Aug. 24, 1987, Ser. No. 88,276

Claims priority, application Japan, Aug. 28, 1986, 61-202382; Aug. 28, 1986, 61-202383; Aug. 28, 1986, 61-202384; Sep. 4, 1986, 61-206681; Sep. 4, 1986, 61-206682; Sep. 4, 1986, 61-206683; Sep. 4, 1986, 61-206684; Sep. 4, 1986, 61-206685; Sep. 4, 1986, 61-206687

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—408 15 Claims



1. An industrial oxygen concentration measuring device for determining an oxygen concentration of a measurement gas, comprising:

a detecting portion comprising a unitary body formed from a plurality of laminated plate members including an oxygen sensing element comprising an oxygen concentration cell made of solid electrolyte, a temperature detecting member and a heater; and

a temperature operational processing unit having temperature compensation operation means for compensating a setting voltage, to which an electromotive force generated by said oxygen concentration cell is compared, for variations in temperature of said detecting portion at temperatures above 600° C., said temperature of said detecting portion being determined by an output signal obtained from said temperature detecting member.

4,875,991

TWO-CATALYST HYDROCRACKING PROCESS

Simon G. Kukes; Jeffrey T. Miller, both of Naperville, and Louis C. Gutberlet, Wheaton, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 27, 1989, Ser. No. 328,576

Int. Cl.[4] C10G *65/10*

U.S. Cl. 208—59 19 Claims

1. A process for hydrocracking a hydrocarbon feedstock with hydrogen at hydrocracking conversion conditions in a plurality of reaction zones is series which comprises:

(a) contacting said feedstock in a first reaction zone with a first reaction zone catalyst comprising a hydrogenation component consisting essentially of a nickel component and a tungsten component deposed on a support component consisting essentially of an alumina component and a crystalline molecular sieve component; and

(b) contacting the effluent from said first reaction zone in a second reaction zone with a second reaction zone catalyst comprising a hydrogenation component consisting essentially of a molybdenum component deposed on a support component consisting essentially of an alumina component and a crystalline molecular sieve component.

4,875,992

PROCESS FOR THE PRODUCTION OF HIGH DENSITY JET FUEL FROM FUSED MULTI-RING AROMATICS AND HYDROAROMATICS

Glen P. Hamner, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 18, 1987, Ser. No. 134,798

Int. Cl.[4] C10G *45/50*

U.S. Cl. 208—89 16 Claims

1. A process for the production of high density jet fuel which comprises,

(A) contacting with hydrogen, in a first stage, a feed comprising (a) sulfur-containing compounds, nitrogen-containing compounds, or mixtures thereof, and (b) at least about 60 percent, based on the total weight of the feed, of liquid hydrocarbon compounds inclusive of fused two-ring aromatic hydrocarbons, hydrogenated fused two-ring aromatic hydrocarbons, or mixtures thereof, over a catalysts which contains one or more of a Group VIB or Group VIII metal, or both Group VIB and Group VIII metals, or compound thereof, at hydrotreating conditions sufficient to hydrodesulfurize or hydrodenitrogenate, or both hydrodesulfurize and hydrodenitrogenate, said feed;

(B) separating and removing sulfur or nitrogen, or both sulfur and nitrogen, from the product of said first stage to produce a liquid product which contains no more than about 20 wppm sulfur, or no more than about 5 wppm nitrogen:

(C) contacting, in a second stage, the liquid product from step (B) with hydrogen, over a fluorided Group VIII metal-on-alumina catalyst to hydrogenate said fused two-ring aromatic hydrocarbons or hydrogenated fused two-ring hydrocarbons of said feed to selectively hydrogenate said aromatic or hydroaromatic hydrocarbons to naphthenes without conversion to lower boiling, lower molecular weight hydrocarbons of the liquid product of step (B) in excess of about 5 percent, based on the weight of said liquid product of step (B);

(D) withdrawing from said second stage a volume of product, based on the product of said first stage fed into second stage, above about 95 percent; and

(E) separating from the product of said second stage hydrogenation reaction a high density jet fuel having a gravity ranging between about 25 API and 35 API, and an aromatic concentration below about 50 percent, based on the total weight of said jet fuel.

4,875,993

PROCESS AND APPARATUS FOR THE CATALYTIC CRACKING OF HYDROCARBON CHARGES

Jean-Louis Mauleon, Marly-le-Roi; Jean-Bernard Sigaud, Vaucresson; Bernard Chapotel, Paris, all of France, and Leonard Seglin, New York, N.Y., assignors to Compagnie de Raffinage et de Distribution Total France, Paris, France

Filed Apr. 26, 1988, Ser. No. 186,396

Int. Cl.[4] C10G *11/18*

U.S. Cl. 208—113 9 Claims

1. A process for the catalytic cracking in a fluidized bed of a hydrocarbon charge comprising:

contacting the charge and grains of a cracking catalyst, in ascending or descending flow in a tubular reactor, to crack the charge and give a spent catalyst with coke deposited thereon;

separating, by ballistic means, the spent catalyst and the cracked charge in a separation zone containing a dilute fluidized phase located above a dense fluidized bed;

mixing in said separation zone spent catalyst with grains of

an at least partially regenerated catalyst which has a temperature exceeding that of the spent catalyst, and which grains are distributed in said separation zone substantially homogeneously in the dilute fluidized phase above the dense fluidized bed and between the ballistic means and an upper surface of the dense fluidized bed;

stripping the spent catalyst in the dense fluidized bed by means of a fluid injected counter-current into the spent catalyst to give a stripped catalyst;

regenerating the stripped catalyst in a regeneration zone under conditions effective to result in combustion of the coke deposited thereon to give a regenerated catalyst; and

recycling the regenerated catalyst to feed the reactor.

4,875,994

PROCESS AND APPARATUS FOR CATALYTIC CRACKING OF RESIDUAL OILS

James H. Haddad, 45 Van Wyck Dr., Princeton Junction, N.J. 08550; Hartley Owen, 5 Riverview Ter., Belle Mead, N.J. 08502, and Klaus W. Schatz, 136 Rolling Hill Rd., Skillman, N.J. 08558

Filed Jun. 10, 1988, Ser. No. 206,243

Int. Cl.[4] C10G *11/18*; B01J *38/34*

U.S. Cl. 208—113 **12 Claims**

1. A process for the catalytic cracking of a heavy, metals laden hydrocarbonaceous feed by contacting a hot regenerated catalyst stream with the feed in a base of riser reactor, cracking the feed in the riser reactor at catalytic cracking conditions to form cracked products and coked catalyst containing metals, separating the coked catalyst from cracked products, stripping the coked catalyst with steam and regenerating the steam stripped catalyst regenerator with an oxygen-containing gas to form hot regenerated catalyst, characterized by:

(a) using a mixture of fluidizable catalytic cracking catalyst and a demetallizing additive, which mixture is resolvable by elutriation;

(b) demetallizing the feed by contacting the feed in the base of the riser reactor with the demetallizing additive and removing a majority of the metals and some coke from the feed to produce a coked additive containing a majority of the metals content of the feed and a demetallized feed;

(c) cracking the demetallized feed in the riser reactor with the hot regenerated cracking catalyst and discharging from the riser reactor cracked products and a mixture of coked cracking catalyst and coked additive;

(d) regenerating the mixture in a first stage regenerator having a base, at least one inlet for coked catalyst and additive, an upper outlet and a lower outlet by adding the mixture to the first stage regenerator, contacting the mixture with an oxygen-containing gas at coke combustion conditions, segregating by elutriation a dense phase fluidized bed with an increased concentration of demetallizing additive, relative to the mixture discharged from the riser, to form a dense phase fluidized bed of regenerated demetallizing additive with a reduced coke content and partially regenerated catalytic cracking catalyst;

(e) removing from the lower outlet of the first stage regenerator a regenerated demetallizing additive and recycling it to the base of the riser reactor;

(f) removing from the upper outlet of the first stage regenerator the partially regenerated catalytic cracking catalyst and discharging it into a second stage regenerator;

(g) regenerating the partially regenerated catalytic cracking catalyst with an oxygen containing gas in the second stage regenerator to produce regenerated catalytic cracking catalyst;

(h) recycling regenerated catalytic cracking catalyst from the second stage regenerator to the riser reactor.

4,875,995

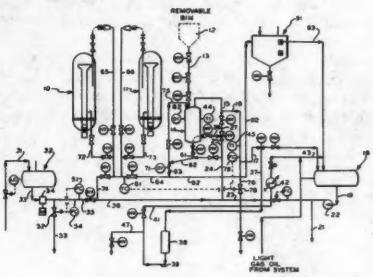
SOLID ADDITION AND WITHDRAWAL

Roger P. Van Driesen, Titusville; William R. Adams, Upper Montclair; Mario Baldassarri, Paramus; John Caspers, Basking Ridge, all of N.J., and Harold Trimble, Grove, Tex., assignors to Lummus Crest, Inc., Bloomfield, N.J.

Division of Ser. No. 811,491, Dec. 20, 1985, Pat. No. 4,744,887. This application Feb. 8, 1988, Ser. No. 153,347

Int. Cl.[4] C10G *35/00*

U.S. Cl. 208—152 **9 Claims**



1. A catalyst withdrawal for withdrawing solids from at least one reactor comprising:

at least one reactor;

a catalyst withdrawal vessel;

first conduit means for withdrawing a first stream comprising a reactor liquid and a solid from said at least one reactor;

second conduit means for supplying a second stream comprising a transport liquid;

third conduit means connected to the first and second conduit means and to the vessel, for combining said first stream with said second stream for introduction into the vessel;

fourth conduit means for withdrawing a mixture of reaction liquid and transport liquid and transport liquid from the vessel;

flow control means for controlling the flow of combined reaction liquid and transport liquid; and

temperature sensing and control means for sensing the temperature in one of the third or fourth conduit means, said temperature sensing and control means being operatively connected to and controlling the flow control means to adjust flow of combined reaction liquid and transport liquid to maintain a set temperature in one of the third or fourth conduit means and thereby maintain a desired rate of withdrawal of the first stream.

4,875,996

METHOD FOR LIQUID FEED DISPERSION IN FLUID CATALYTIC CRACKING SYSTEMS

C. Richard Hsieh, San Rafael; Desmond F. King, El Sobrante; Frederick A. Pettersen, Novato, and Cathleen A. Shargay, Pleasant Hill, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 834,410, Feb. 28, 1986, abandoned. This application Feb. 3, 1988, Ser. No. 153,478

Int. Cl.[4] C10G *11/18*

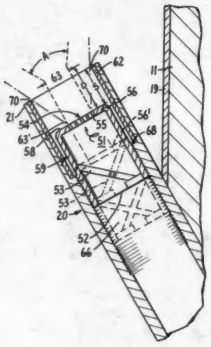
U.S. Cl. 208—157 **13 Claims**

1. A method for liquid feed dispersion in fluid catalytic hydrocarbon cracking systems wherein heated catalyst is circulated through a riser reactor tube for contact with a liquid hydrocarbon feed, said liquid feed optionally including water or steam forming a part of said feed to improve atomization and/or vaporization by reducing the hydrocarbon partial pressure of said feed, comprising the steps of:

introducing said liquid hydrocarbon feed as an unconfined single-liquid phase stream into said riser reactor tube to contact a stream of heated catalyst particles flowing therethrough by first imparting to said single-liquid phase stream free vortical rotation about its axis of flow, said vortical rotation being imparted solely by flow of said single-liquid phase stream through a cylindrical chamber positioned in line with and as a cylindrical extension of a conduit supplying said feed to said riser reactor;

passing said single-phase liquid hydrocarbon feed stream during said free vortical rotation through a square-edged orifice having a diameter less than the diameter of said chamber and having a throat substantially shorter than said orifice diameter;

maintaining the hydraulic pressure of said single-phase liquid stream flowing through said square-edged orifice to retain a generally cylindrical form of the vena contracta induced in said stream by free flow thereof through said square-edged orifice for discharge into said riser reactor tube before dispersion solely by said vortical flow induced in said feed stream into a substantially uniform conical mist of liquid drops for contact with said stream of heated catalyst particles;



concentrically surrounding said square-edged orifice and the vena contracta of said feed stream within a protective pipe over the length of the induced vena contracta and up to said uniform conical mist for dispersion of said liquid feed stream flowing from said orifice so that the discharged liquid disperses in said riser reactor tube without impingement against the inside of said protective pipe; and

shielding at least the inner surface of said protective pipe and said nozzle against eddy currents of catalyst particles that my be created in the annular space between said protective pipe and said vena contracta of said feed stream to prevent catalyst erosion of said orifice and the inner surface of said pipe.

4,875,997

PROCESS FOR TREATING HYDROCARBONS CONTAINING MERCAPTANS

Virgil Langford, Great Falls, Mont., assignor to Montana Refining Company, Black Eagle, Mont.

Filed Nov. 17, 1988, Ser. No. 272,614

Int. Cl.[4] C10G *19/02, 19/08*

U.S. Cl. 208—235 **36 Claims**

1. A process for treating hydrocarbon streams containing mercaptans comprising the steps of:

(a) contacting a first mercaptan-containing hydrocarbon stream with a first aqueous alkaline solution stream to form a mercaptide-rich aqueous alkaline solution stream and a reduced-mercaptan hydrocarbon stream;

(b) combining said mercaptide-rich aqueous alkaline solution stream with a second mercaptan-containing hydrocarbon stream and with oxygen to form a first mixture;

(c) oxidizing said mixture to form a second mixture of hydrocarbon, disulfides and aqueous alkaline solution; and

(d) separating said second mixture into a disulfide-containing hydrocarbon stream and a regenerated aqueous alkaline solution stream;

whereby said second hydrocarbon stream is sweetened and said mercaptide-rich aqueous alkaline solution is regenerated simultaneously in the same step.

4,875,998

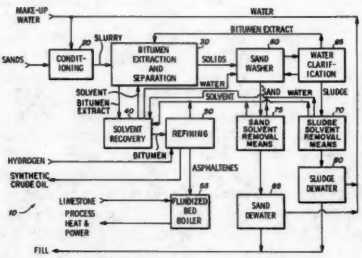
HOT WATER BITUMEN EXTRACTION PROCESS

John S. Rendall, Albuquerque, N. Mex., assignor to Solv-Ex Corporation, Albuquerque, N. Mex.

Continuation-in-part of Ser. No. 930,018, Nov. 7, 1986, abandoned, which is a continuation of Ser. No. 757,677, Jul. 22, 1985, abandoned. This application Feb. 18, 1988, Ser. No. 157,489

Int. Cl.[4] C10G *1/00*

U.S. Cl. 208—390 **15 Claims**



1. A method of extracting bitumen oils from tar-sands ore comprising the steps of:

a. an initial conditioning step comprising crushing tar-sands ore to yield solid particles of a maximum size required by a log washer conditioner in a second conditioning step;

b. said second conditioning step comprising mixing said crushed solid particles with hot water, while excluding air and solvent therefrom to form a slurry of said solid particles and water, and agitating said slurry using a mechanical agitation means comprising said log washer conditioner;

c. a bitumen extraction step comprising dissolving a quantity of bitumen oils from said slurry by adding a quantity of bitumen extract and a solvent, and allowing said solid particles and said bitumen oils to contact said bitumen extract and said solvent in said slurry for a time period whereby substantially all of said bitumen oils dissolve in said solvent;

d. a bitumen separation step comprising separating said slurry into a bitumen extract phase comprising said bitumen oils, fines and water in said solvent and a wet solids component comprising sand, fines and water, using density separation means;

e. a solvent recovery step comprising stripping and recovering said solvent and water from said bitumen extract phase for reuse in the method, thereby producing said bitumen oils free of said solvent and water;

f. a sand washing and water clarification step comprising separating said wet solids component into a wet sand component, water, bitumen extract and a sludge component and recovering said water;

g. a sand solvent recovery step comprising removing said solvent from said wet sand component to yield said solvent, wet sand and water; and

h. a sludge solvent recovery step comprising removing said solvent from said sludge component to yield said solvent, sludge and water.

4,875,999

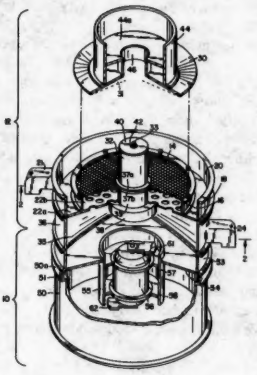
APPARATUS AND METHOD OF CLASSIFYING PARTICLES

William J. Haight, Pleasantville, N.Y., assignor to Mineral Recovery Corporation, Pleasantville, N.Y.

Continuation of Ser. No. 868,154, May 22, 1986, abandoned, which is a continuation of Ser. No. 616,782, Jun. 1, 1984, abandoned, which is a continuation of Ser. No. 475,960, Mar. 16, 1983, abandoned. This application Jul. 21, 1987, Ser. No. 77,049

Int. Cl.[4] B07B *13/00*

U.S. Cl. 209—245 26 Claims



1. In an apparatus for classifying particles and having a screen for separating undersized particles from a mass of particles carried thereby, the apparatus having means for imparting gyratory motion to the screen, said motion having a laterally eccentric component and a repetitive vertical component for fluidizing and resulting in directions of flow of particles on the screen and providing a radially directed throw, the improvement comprising:

a lid overlying the screen, said lid defining with said screen a classification chamber and providing a reaction surface for contacting active particles in said chamber, said chamber having an exit for oversized particles located along the circumference of said apparatus; and

means for introducing particles into said chamber at a portion thereof located radially distant from said exit, and means for dispersing introduced particles across the surface of the screen toward said exit in a direction opposite to the direction of said throw.

4,876,000

POSTAL STAMP PROCESS, APPARATUS, AND METERING DEVICE, THEREFOR

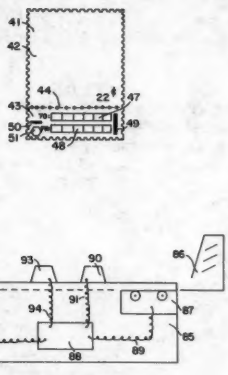
Ameer G. Mikhail, 2103 Windom Ct., Bel Air, Md. 21014

Continuation-in-part of Ser. No. 819,298, Jan. 16, 1986, Pat. No. 4,715,622. This application Aug. 28, 1987, Ser. No. 90,839

Int. Cl.[4] B07C *5/00*

U.S. Cl. 209—584 2 Claims

1. A mail sorting process for sorting mail, each mail piece having thereon at least one postal stamp, each postal stamp having at least two surfaces at least one of which is ungummed, said stamp being formed of at least two separate pieces, one piece of said stamp containing on its ungummed surface some markings that may define the attributes of said stamp, another piece of said stamp containing on its ungummed surface indicia for entering with a tool special codes identifying both the origination and destination mailing centers where such entering can be detected and read by a scanning device, the same piece of said stamp having at least one distinct marking printed for use as a reference frame to alert said scanning device in determining the location and orientation of said special codes of each of said origination and said destination mailing centers, said same piece of said stamp having a different marking printed thereon which defines the monetary value of said stamp, said marking being detectable and readable by either said scanning device or by a similar scanning device, the process comprising the steps of; triggering the scanning device of a scanning machine by the reference frame markings printed on the stamps affixed on a mail piece to be sorted in association with both the origination and destination identifier codes,



reading identifier codes at any orientation angle and the postal monetary value marking printed on each stamp by another scanning device, storing the read information temporarily in said machine, adding up the total monetary value of said stamps, storing this added up monetary value temporarily, calculating the postal distance between two read origination and destination codes based on preset tables, weighing the mail piece and storing the weight value temporarily, computing the postage fee value by employing the postal distance and the measured weight and storing said values temporarily, comparing the read total postage value affixed to said mail piece to the required postage fee value as compared earlier, and marking the mail piece before routing to a special container for further special processing if the comparison indicates that postage is due.

4,876,001

APPARATUS FOR USE WITH A POOL CLEANER

Carl F. W. Supra, Ranburg, South Africa, assignor to Liberty Pool Products S.A., Switzerland

Filed Apr. 6, 1987, Ser. No. 34,986

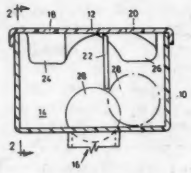
Claims priority, application South Africa, Apr. 4, 1986, 86/2501; Apr. 23, 1986, 86/3024

Int. Cl.[4] E04H *3/20*

U.S. Cl. 210—123 12 Claims

1. Apparatus for use with a swimming pool cleaner, which includes a housing which defines a chamber, a first opening which is formed through a wall of the housing to the chamber and which is adapted to be connected to a water suction source, first and second inlets including at least a second opening which is formed through the wall of the housing to the chamber and which permits water flow into the chamber, and a valve means for alternately sealing the first opening and

leaving the first opening unsealed, each time water commences to flow from the second to the first opening, respectively,



said valve means including a buoyant body and means for drawing the buoyant body to the first opening by water flow and for causing the body to rise away from the first opening when the water flow ceases.

4,876,002

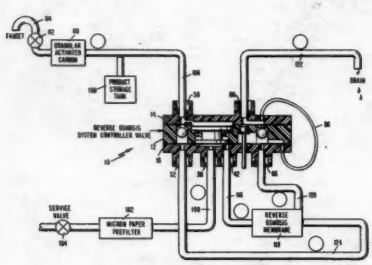
REVERSE OSMOSIS WATER PURIFICAITON UNIT

John D. Marshall, and Thomas N. Mclain, both of Montgomery, Ala., assignors to Schlumberger Industries, Inc., Atlanta, Ga.

Filed Jun. 13, 1988, Ser. No. 205,751

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—136 **19 Claims**



15. A control valve mechanism for a reverse osmosis water purifying system comprising:

(a) a body plate having a pair of substantially parallel planar surfaces; an upper housing plate having at least one planar surface; a lower housing plate having at least one planar surface; said body plate and upper and lower housing plates being assembled together in sandwich fashion with their planar surfaces in facing disposition;

(b) first valve means within said sandwiched plates; said first valve means comprising:

(i) piston means having an upper piston end of a first diameter, a lower piston end of a second smaller diameter and an intermediate piston portion of still smaller diameter joining the piston ends; said piston ends and intermediate portion being coaxially aligned on an axis substantially perpendicular to said planar surfaces;

(ii) a first cylindrical cavity in said body plate receiving said upper piston end for reciprocable motion therein; a second cylindrical cavity in said body plate coaxial with said first cavity receiving said lower piston end for reciprocable motion therein; and a third cylindrical cavity in said body plate coaxial with and connecting said first and second cavities and receiving said intermediate piston portion for reciprocable motion therein; said piston ends having end surfaces which are substantially parallel to said planar surfaces; spring means disposed between said upper piston end and the floor of said first cavity in said body plate; said spring means urging said piston assembly towards said upper housing plate;

(iii) said housing plate having a cylindrical cavity overlying said first cavity in said body plate and being of substantially the same diameter and coaxially aligned therewith;

(iv) said lower housing plate having a cylindrical cavity underlying said second cavity in said body plate and being of substantially the same diameter and coaxially aligned therewith;

(v) said cylindrical cavity in said lower housing plate having a floor generally perpendicular to the axis of said cylindrical cavity;

(vi) a circular rib extending upward from said floor to the substantially planar surface of said lower housing plate;

(vii) said lower housing plate having a first port providing communication with said cylindrical cavity within the periphery of said rib and a second port providing communication with said cylindrical cavity outside the periphery of said rib;

(c) second valving means within said sandwiched plates comprising:

(i) first check ball means carried by said body plate within a cylindrical check ball cavity having an axis substantially parallel to the axis of said piston assembly;

(ii) a port in said upper housing plate communicating with said cylindrical check ball cavity in said body plate;

(iii) a port in said lower housing plate communicating with said cylindrical check ball cavity in said body plate;

(iv) said upper housing plate having passage means extending from said port communicating with said cylindrical check ball cavity in said body plate; said passage means providing communication between said port and said cylindrical cavity in said upper housing plate overlying said first cavity in said body plate;

(d) third valve means within said sandwiched plates comprising:

(i) second check ball means carried by said body plate in a cylindrical check ball cavity having an axis substantially parallel to the axis of said piston assembly;

(ii) port means in said lower housing plate communicating with said cylindrical check ball cavity in said body plate;

(iii) said lower housing plate having a first tube port therein communicating with said cylindrical check ball cavity in said body plate;

(iv) said upper housing plate having an effluent cavity therein facing said body plate and having a second tube port connected to said effluent cavity;

(e) fourth valve means within said sandwiched plates comprising:

(i) a flush valve including a rectilinear operating member extending through an aperture in said lower housing plate; a plug end mounted at the upper end of said operating member and received in a cylindrical flush cavity in said body plate for reciprocating motion into and out of said cavity; said body plate having passage means interconnecting said flush cavity and said cylindrical check ball cavity for said second check ball means.

4,876,003

ENCASED POOL CHEMICAL TABLET WITH DOMED ENDS

John M. Casberg, Cheshire, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed May 9, 1988, Ser. No. 191,640

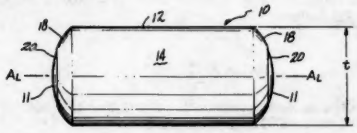
Int. Cl.[4] C02F *1/76*

U.S. Cl. 210—169 **19 Claims**

1. A halogen compound containing chemical tablet for dissolution in a surrounding body of water comprising in combination:

(a) an elongate halogen containing tablet of a length longer than its thickness, the tablet having an elongate central section connecting two opposing obliquely tapered ends along a longitudinal axis; and

(b) an elongate tablet shell encasing the tablet having an elongate central section connecting two opposing obliquely tapered ends, the ends each having an opening



therein centered on the longitudinal axis of the tablet and forming an inwardly sloping and an obliquely angled junction with the shell's elongate central section, the tablet shell fitting securely about the tablet.

4,876,004

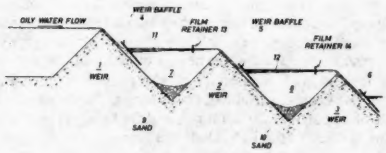
TOPOLOGICAL SEPARATOR

Abraham Verhoeff, Toronto, Canada, assignor to Shell Canada Limited, Toronto, Canada and Shell Explorer Limited, Houston, Tex.

Continuation of Ser. No. 274,930, Jun. 18, 1981, abandoned, which is a continuation of Ser. No. 111,493, Jan. 10, 1980, abandoned. This application May 16, 1988, Ser. No. 196,801

Int. Cl.[4] E02B *3/20*

U.S. Cl. 210—170 **2 Claims**



1. Apparatus for collecting a floating pollutant on a liquid surface comprising a weir dam having an upstream side and a sloped downstream side; a first pollutant impermeable baffle closely adjacent to the downstream side of the weir dam; a pool of liquid on the downstream side of said weir dam, said baffle partly extending into the top of the pool of liquid; means for flowing the pollutant and liquid over the weir dam, said baffle partly extending into the top of the pool of liquid; means for flowing the pollutant and liquid over the weir dam, then between the sloped downstream side of the weir dam and the pollutant impermeable baffle and into the pool; a second pollutant impermeable baffle extending into the top of the pool downstream of the first baffle and functionable to collect pollutant between the two baffles; a second weir dam having sloped upstream and downstream sides and being located downstream of the second baffle, the top of the second weir dam being below the top of the first weir dam; and the two dams having a contoured bottom therebetween.

4,876,005

HIGH PRESSURE COLUMN ASSEMBLY FOR A LIQUID CHROMATOGRAPH SYSTEM

William G. America, Danbury, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 155,394, Feb. 12, 1988, abandoned. This application Dec. 8, 1988, Ser. No. 281,374

Int. Cl.[4] B01D *15/08*

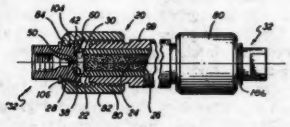
U.S. Cl. 210—198.2 **9 Claims**

1. In combination in a liquid chromatography column assembly including a hollow cylindrical separation column containing a packing material constituting the stationary phase, a liquid permeable discoid frit mounted at each end of the column for retaining the packing material, and a cylindrical housing enveloping the column, a column coupling assembly for each end of said column, comprising:

a tubular coupler member having at one end a concentric radially outwardly extending annular flange disposed coaxially with said column and with the front face of the flange in confronting relation to the end of said column, said front face containing a concentric annular groove radially disposed to be in apposition to the end of said column and the outermost circumferential portion of said discoid frit;

an annular gasket member disposed in said groove and projecting beyond said face of the flange;

a cylindrical collar member having an inwardly extending radial flange at one end, disposed in coaxial relation to said coupler member and said housing, the inwardly extending



radial flange of said collar member and outwardly extending annular flange of said coupler member having radial dimensions such as to place the respective back faces of said flanges in apposition, the inner diameter of the collar member flange being sufficient to accommodate passage of said tubular coupler member except for the outwardly extending flange thereof; and

means for threadedly coupling said collar member to the end of said housing member, whereby rotation of the collar in one direction relative to the housing member produces axial relative displacement therebetween with concomitant engagement of said apposing flange back faces toward each other and compression of said gasket against the end of said column and circumferential portion of said frit without substantial rotational displacement of said gasket relative to said column end.

4,876,006

HOLLOW FIBER FILTER DEVICE

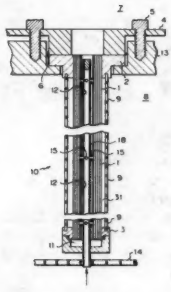
Kazuo Ohkubo; Tadamasa Hayashi, and Hiroshi Nagai, all of Tokyo, Japan, assignors to Ebara Corporation, Tokyo, Japan

Continuation of Ser. No. 915,232, Oct. 3, 1986, abandoned. This application Apr. 19, 1988, Ser. No. 186,707

Claims priority, application Japan, Oct. 8, 1985, 60-222860; Oct. 24, 1985, 60-236402

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.69 **10 Claims**



1. A hollow fiber filter device comprising:

a filter casing, a separating plate extending across said casing

for separating the casing into a filtering chamber defined on one side of said plate and a filtered liquid chamber on the other side of said plate, an inlet port extending through said filter casing and in communication with said filtering chamber, and an outlet port extending through said filter casing and in communication with said filtered liquid chamber;

a plurality of filter modules each extending from said separating plate into said filtering chamber,

each of said filter modules comprising a fiber bundle plate supported on said separating place, a plurality of elongated hollow fibers connected to and extending from said fiber bundle plate into said filtering chamber, said fibers having respective open first ends open to said filtered liquid chamber and respective open second ends opposite said first ends, a space forming means enclosing said second ends of said fibers and spaced therefrom for establishing a space open to said second ends that is sealed from said filtering chamber, a single pipe operatively connected to said fiber bundle plate and extending through a central portion of said plurality of fibers and between said fibers bundle plate and said space forming means for placing said space in communication with said filtered liquid chamber, and an air pipe extending through said single pipe;

an air injection pipe in said filtering chamber for introducing air into said filtering chamber;

an air distributor plate disposed in said filtering chamber between said modules and said air injection pipe for distributing the air introduced into said filtering chamber by said air injection pipe over an area at which said modules are disposed; and

said air pipe having a closed first end, an open second end extending through said space forming means and through said air distributor plate, and plural air injection nozzles extending through and open at the exterior of said single pipe.

4,876,007

PLATE-TYPE FILTER CARTRIDGE WITH INTERNAL SUPPORT

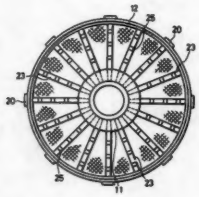
Kyoichi Naruo; Sumio Ohtani; Masahiro Etoh; Masao Tsuruta; Ikuro Moriya; Masanori Ishiguro, and Akira Matsumoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 28, 1987, Ser. No. 90,474

Claims priority, application Japan, Aug. 28, 1986, 61-200179; Sep. 17, 1986, 61-217302; Sep. 17, 1986, 61-217304

Int. Cl.[4] B01D *29/34*

U.S. Cl. 210—339 **7 Claims**



1. A plate-type filter cartridge comprising at least one plate-type filtration unit, said filtration unit comprising:

an internal support;

a pair of filtration membranes disposed at upper and lower portions of said internal support such that said internal support extends in between said pair of filtration membranes; and

a pair of first netty members formed from fibrous material provided respectively between and contacting said internal support and respective ones of said filtration membranes for holding said filtration membranes to thus form said filtration unit, wherein said internal support comprises a central cylindrical member, an outer rim and a plurality of spokes integral with said cylindrical member and said outer rim and extending in the radial direction of said filtration unit between said cylindrical member and said outer rim.

4,876,008

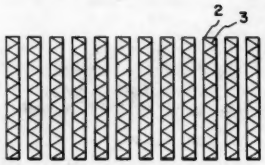
SIEVE PLATE

Tim Tikkanen, Benalmadena, Spain, assignor to Panel International Ltd. p.l.c., London, England

Filed Oct. 6, 1988, Ser. No. 254,043

Int. Cl.[4] B01D *39/10*

U.S. Cl. 210—498 **3 Claims**



2. A sieve plate adapted to be placed across a flow of slurry and defining downstream and upstream sides, said sieve plate comprising a sheet of metal formed with a plurality of spaced relatively broad grooves on the downstream side, the thickness of the sheet measured from a bottom surface of said groove to the upstream side of the plate being about 1 mm, the sheet also being formed with a plurality of elongate slots through the sheet at the bottom surface of the grooves, the slots being of a width of about 0.05 to 1 mm, the slots being arranged in a zig-zag fashion in the individual grooves.

4,876,009

TETRAKIS-AMIDO HIGH FLUX MEMBRANES

Scott B. McCray, Bend, Oreg., assignor to Bend Research, Inc., Bend, Oreg.

Filed Oct. 21, 1988, Ser. No. 260,585

Int. Cl.[4] B01D *13/00, 13/01*

U.S. Cl. 210—500.33 **8 Claims**

1. A composite reverse osmosis membrane comprising a microporous polymeric support and the polyamide reaction product of a tetrakis-aminomethyl compound of the formula $C—NHMe)_4$ with an aromatic polyacylhalide of the formula $Ar—COX)_n$ where Me is methyl, Ar is aryl, X is halide and n is 2 or 3.

4,876,010

WASTE TREATMENT CLEANER APPARATUS

Dana Riddle, 230 Pineland Dr., Smyrna, Ga. 30082

Filed Oct. 3, 1988, Ser. No. 252,117

Int. Cl.[4] B01D *23/00*

U.S. Cl. 210—525 **12 Claims**

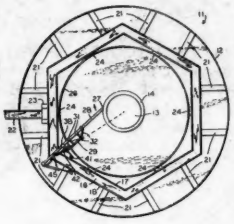
1. For use in a settling tank having a substantially cylindrical outer wall, a centrally located rotatable member, an effluent channel having a plurality of surfaces with said channel being concentrically located with respect to the rotatable member between the rotatable member and the outer wall and drain means for the channel; cleaning means for cleaning at least one of the surfaces of the channel comprising:

a sweep arm affixed to the rotatable member at one end and extending toward the outer wall of the tank along a longitudinal axis, said sweep arm having a distal end located adjacent the outer wall;

a first cleaning member mounted on said sweep arm and extending toward the channel surface to be cleaned;

biasing means for maintaining a portion of said cleaning member in contact with the surface to be cleaned during rotation of the rotatable member;

said first cleaning member comprising a cleaner arm pivotally mounted at one end to said sweep arm and a scrubbing



member mounted to the distal end of said cleaner arm, said scrubbing member being maintained in contact with the surface to be cleaned by said biasing means;

said cleaner arm being pivotally mounted to said sweep arm by a clamp member adapted to move about the said longitudinal axis of said sweep arm.

4,876,011

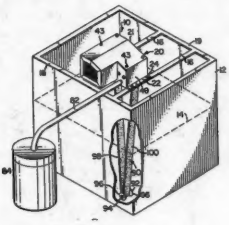
OIL RECOVERY APPARATUS

Peter Betts, Prior Lake, and Darrell D. John, Shakopee, both of, assignors to Donaldson Company, Inc., Minneapolis, Minn.

Continuation of Ser. No. 866,140, May 22, 1986, abandoned. This application May 17, 1988, Ser. No. 196,758

Int. Cl.[4] C02F *1/40*

U.S. Cl. 210—526 **12 Claims**



1. An apparatus for skimming oil from the surface of a liquid, said apparatus comprising:

an endless belt of hydrophobic non-absorbent material formed from a plurality of densely packed loops from the loop portion of a hook and loop type fastener;

support means for supporting a first portion of said belt above said liquid;

submersion means for submersing a second portion of said belt within said liquid;

drive means for urging said belt to travel about said support means and said submersion means with said support means and said submersion means dividing said belt into two runs including a first run moving from said support means to said submersion means and a second run moving from said submersion means to said support means with said oil captured on said second run;

means for separating said captured oil from said second run above said liquid; and

means for collecting said separated oil.

4,876,012

HOLLOW FIBRE FILTER CARTRIDGE AND HEADER

Clinton V. Kopp, Castle Hill; Dennis Roberts, Berowra Heights; Bruce G. Biltoft, Annandale, and Victor White, Lane Cove, all of Australia, assignors to Memtec Limited, Parramatta, Australia

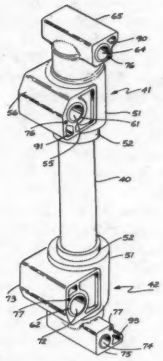
PCT No. PCT/AU87/00309, § 371 Date May 6, 1988, § 102(e) Date May 6, 1988, PCT Pub. No. WO88/01895, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 10, 1987, Ser. No. 236,671

Claims priority, application Australia, Sep. 12, 1986, PH7971

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—644 **31 Claims**



1. A filter unit comprising:

(i) an elongated open-ended casing having transfer ports adjacent each end thereof to provide fluid communication between the outside and inside of the casing,

(ii) a bundle of hollow, porous, polymeric fibres within the casing,

(iii) a first plug at one end of the casing in which one end of the bundle of fibres is embedded whereby the plug prevents flow of fluid out said one end of the casing other than through the lumens of the fibres,

(iv) means for preventing substantial flow of fluid out of said casing other than through the lumens of said fibres within said casing and which includes a second plug closing the other end of the casing for preventing the flow of feed through the end of the casing,

(v) a first transfer header at said one end of the casing and including:

(a) a body portion that encloses said one end of the casing,

(b) a feed passageway extending through said first header having an inlet at one end for receiving feed to be treated, an outlet at the other end adapted to be connected to the inlet of the feed passageway of an adjacent first header and a discharge port for delivering feed to the casing,

(c) an inlet chamber in fluid communication with the discharge port of the feed passageway and the transfer port at said one end of the casing,

(d) an outlet chamber for receiving filtrate from the open ends of the fibre lumens, and,

(e) a filtrate passageway extending through said first header having a receiving port for receiving filtrate from the outlet chamber, an outlet at one end for discharging filtrate and an inlet at the other end adapted to be connected to the outlet of the filtrate passageway of an adjacent first header,

(vi) a second transfer header at the other end of the casing and including:

(a) a body portion that encloses said other end of the casing,

(b) an outlet chamber for receiving treated feed from the transfer port at said other end of the casing, and,

(c) a treated feed passageway extending through said second header having a receiving port for receiving treated feed from the outlet chamber, an outlet at one end for discharging treated feed and an inlet at the other end adapted to be connected to the outlet of the feed passageway of an adjacent second header.

23. A bank of filter units wherein each filter unit comprises:

(i) an elongated open-ended casing having transfer ports adjacent each end thereof to provide fluid communication between the outside and inside of the casing,

(ii) a bundle of hollow, porous, polymeric fibres within the casing,

(iii) a first plug at one end of the casing in which one end of the bundle of fibres is embedded whereby the plug prevents flow of fluid out said one end of the casing other than through the lumens of the fibres,

(iv) means for preventing substantial flow of fluid out of said casing other than through the lumens of said fibres within said casing and which includes a second plug closing the other end of the casing for preventing the flow of feed through the end of the casing,

(v) a first transfer header at said one end of the casing and including:

(a) a body portion that encloses said one end of the casing,

(b) a feed passageway extending through said first header having an inlet at one end for receiving feed to be treated, an outlet at the other end adapted to be connected to the inlet of the feed passageway of an adjacent first header and a discharge port for delivering feed to the casing,

(c) an inlet chamber in fluid communication with the discharge port of the feed passageway and the transfer port at said one end of the casing,

(d) an outlet chamber for receiving filtrate from the open ends of the fibre lumens, and,

(e) a filtrate passageway extending through said first header having a receiving port for receiving filtrate from the outlet chamber, an outlet at one end for discharging filtrate and a inlet at the other end adapted to be connected to the outlet of the filtrate passageway of an adjacent first header,

(vi) a second transfer header at the other end of the casing and including:

(a) a body portion that encloses said other end of the casing,

(b) an outlet chamber for receiving treated feed from the transfer port at said other end of the casing, and,

(c) a treated feed passageway extending through said second header having a receiving port for receiving treated feed from the outlet chamber, an outlet at one end for discharging treated feed and an inlet at the other end adapted to be connected to the outlet of the feed passageway of an adjacent first header and the filters are connected together by said headers so that the feed passageways and filtrate passageways are connected in series whereby each filter may be supplied from the one source of feed with a portion of the feed being introduced into the inlet chamber of each filter, the filtrate from each filter is directed to the interconnected filtrate passageways and the treated feed from each filter is directed to the interconnected treated feed passageways.

27. A method of operating a filter unit which utilizes fibre lumens and which comprises:

(i) draining the fibre lumens of filtrate,

(ii) terminating the feed flow with feed remaining on the feed side of the filter and applying gas to the lumens to pressurize the filter,

(iii) releasing the pressure on the feed side of the filter while maintaining the gas pressure and while there is no flow of feed,

(iv) resuming flow of feed and maintaining gas pressure in the lumens to carry substantially all of the accumulated detritus out of the filter,

(v) removing the gas pressure from the filtrate side of the filter and filtrate allowed to refill the lumens, and

(vi) pressurizing the filter so as to replace the gas in the pores of the membrane with liquid.

4,876,013

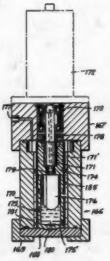
SMALL VOLUME ROTARY FILTER

Iosif Shmidt, Brooklyn, and Mario Badiali, Bronx, both of N.Y., assignors to Membrex Incorporated, Garfield, N.J.

Division of Ser. No. 61,007, Jun. 10, 1987, Pat. No. 4,790,942, which is a continuation of Ser. No. 684,304, Dec. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 563,319, Dec. 20, 1983, abandoned. This application Feb. 26, 1988, Ser. No. 160,693

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—650 **19 Claims**



1. A rotary vertical filtration device for separating small volumes of liquid into permeate and concentrate portions, the concentrate not filtered by the end of separation being the retentate, said device having a very small minimum retentate volume and no bottom dynamic seal and comprising:

(a) a rotor member having a top portion, an essentially cylindrical or conical outer wall, a vertical longitudinal central axis of rotation, and a bottom wall through which permeate cannot be removed;

(b) a housing with an essentially cylindrical or conical having a top, a side, and a bottom defined by (i) a top housing member, (ii) an essentially cylindrical or conical housing inner wall larger in diameter than the rotor member, and (iii) a bottom housing member, the rotor member being rotatably connected to the housing and being within the cylindrical or conical cavity, the cavity having a vertical longitudinal axis substantially parallel to the longitudinal axis of the rotor member, the essentially cylindrical or conical housing inner wall corresponding to and being closely spaced from the corresponding portion of the cylindrical or conical outer wall of the rotor member to define an essentially cylindrical or conical narrow gap between said inner and outer walls;

(c) a filter that allows permeate to pass through it mounted on the cylindrical or conical outer wall of the rotor member or on the cylindrical or conical inner wall of &:he housing, the filter having a filtration area whose lower extent is very close to the bottom housing member to minimize the minimum retentate volume of the cavity, which retentate cannot be filtered because that minimum volume is below the lower extent of the filtration area;

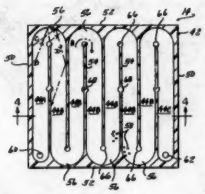
(d) entry means to allow liquid to enter the gap; and

(e) means to rotate the rotor member so that the calculated Taylor number for liquid in the gap is greater than about 40.

4,876,014
METHOD AND APPARATUS FOR PRODUCING ULTRAPURE WATER

William S. Malson, Warren, Mich., assignor to Water Systems Development Corporation, Fraser, Mich.

Filed Mar. 21, 1988, Ser. No. 170,948
Int. Cl.[4] C02F 9/00
U.S. Cl. 210—668 16 Claims



1. A method for purifying aqueous media comprising the steps of:

orienting the aqueous media in a steady stream;

introducing the stream sequentially into a plurality of purification zones, the purification zones containing granular purification media contained in fixed beds and a plurality of stream-deflecting, turbulence inducing elements disposed therein;

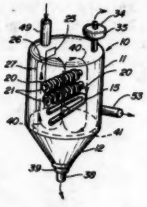
contacting the turbulent aqueous stream to be purified with activated carbon contained within at least the first purification zone; and then

contacting the turbulent aqueous stream with a plurality of ion exchange resins, the total ion exchange resin comprising from about 40 to about 80% of an anionic exchange resin, from about 20 to about 60% of the ion exchange resin being a cationic exchange resin and the remainder being a mixed cationic-anionic ion exchange resin.

4,876,015
METHOD AND APPARATUS FOR RECLAIMING USED HYDRAULIC FLUID

Kenneth D. McKibben, Defiance, Ohio, assignor to CMI International, Inc., Southfield, Mich.

Filed Aug. 19, 1988, Ser. No. 233,734
Int. Cl.[4] B03C 1/30
U.S. Cl. 210—695 16 Claims



1. A method for reclaiming oil by removing therefrom foreign materials including water, sludge, dirt, metal particles and other foreign materials, comprising:

providing a vertically axised tank whose upper portion forms a circulation chamber and whose lower portion forms a settling bowl;

placing a batch of oil to be reclaimed into the tank;

applying low-temperature heat to the oil in a heat zone extending transversely of the tank and located near the bottom of the tank upper portion;

maintaining the tank lower portion at a lower temperature than the heat zone;

circulating the heated oil in a generally vertical, closed loop path, upwardly from the heat zone towards the top of the tank upper portion and downwardly towards the heat zone by the application of said heat to the oil;

subjecting the circulating fluid within the tank upper portion to a magnetic field arranged within the tank above the heat zone and formed by magnets for attracting and immobilizing ferrous metal particles carried by the oil, so as to remove such particles from the oil;

permitting foreign particles mixed into the oil to settle, by gravity, downwardly into the tank lower portion while the oil is circulated within the tank upper portion;

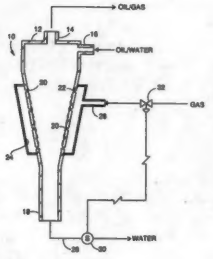
pumping the oil from the tank upper portion after a predetermined period of circulation therein; and

draining the tank lower portion from its bottom from time to time, but at a time when the tank upper portion has been pumped out for removing oil and foreign material accumulated in the tank lower portion.

4,876,016
METHOD OF CONTROLLING THE SEPARATION EFFICIENCY OF A HYDROCYCLONE

Grant A. Young, Tulsa; William D. Wakley, Broken Arrow, and Steven L. Andrews, Tulsa, all of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Jun. 27, 1988, Ser. No. 211,539
Int. Cl.[4] C02F 1/38; B01D 17/038; B04C 5/18, 11/00
U.S. Cl. 210—739 9 Claims



1. A method of controlling the quantity of a first liquid being discharged with a denser second liquid from a hydrocyclone, the hydrocyclone including a conical body with an upper liquid mixture inlet, a drive fluid inlet spaced below the liquid mixture inlet, an upper overflow outlet for discharge of the first liquid in the drive fluid, and a lower underflow outlet for discharge of the second liquid, the method comprising:

(a) monitoring the quantity of the first liquid being discharged with the second liquid from the lower underflow outlet; and

(b) if the monitored quantity of the first liquid being discharged with the second liquid is outside prescribed limits, then varying the quantity of the drive fluid introduced into the conical body to minimize the quantity of the first liquid being discharged with the second liquid from the lower underflow outlet.

4,876,017

USE OF POLYALPHALOLEFIN IN DOWNHOLE DRILLING

David O. Trahan, Rte. 2, Box 2210, Abbeville, La. 70510, and Michael B. Faulk, Rte. 2, Box 92, Kaplan, La. 70548

Filed Jan. 19, 1988, Ser. No. 145,149
Int. Cl.[4] C09K 7/06, 7/02; E21B 31/03
U.S. Cl. 252—8.51 **9 Claims**

1. A drilling fluid composition of matter for lubricating drill pipe during drilling, the composition of matter comprising:
(a) a water base mud system; and
(b) a polyalphaolefin and emulsifier added to the water base mud system as a liquid with the polyalphaolefin in a 2 to 10 centistoke viscosity range.

8. A process for unsticking drill pipe when employing a water base mud system, where the drill pipe has become stuck against a formation due to differential pressure between the formation and the drill pipe, the process comprising the following steps:
(a) locating a point downhole where the drill pipe has become stuck against the formation;
(b) combining a liquid polyalphaolefin in a 2 to 10 centistoke viscosity range with an emulsifier; and
(c) introducing a certain volume of the liquid polyalphaolefin-emulsifer combination downhole to the depth of the point of the stuck pipe and in a quantity sufficient to unstick the pipe.

4,876,018

USE OF ORGANIC FLUOROCHEMICAL COMPOUNDS WITH OLEOPHOBIC AND HYDROPHOBIC GROUPS IN ASPHALTENIC CRUDE OILS AS VISCOSITY REDUCING AGENTS

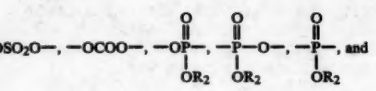
Athanasios Karydas, Brooklyn, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 892,213, Jul. 31, 1986, Pat. No. 4,769,160. This application Jan. 19, 1988, Ser. No. 145,434
The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.
Int. Cl.[4] E21B 37/06, 43/22; F17D 1/17
U.S. Cl. 252—8.551 **10 Claims**

3. A method of reducing the viscosity of an asphaltenic crude oil comprising incorporating into said crude oil an effective viscosity reducing amount of an oil soluble organic compound of the formula

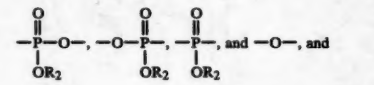
$$[(R_f)_nR']_mZ \qquad (I)$$

wherein
n is an integer of 1–3;
m is an integer of 1–5000;
R_f is an inert, stable, oleophobic and hydrophobic fluoroaliphatic group having about 4 to about 20 carbon atoms;
R′ is a direct bond or an organic linking group having a valency of n+1 and is covalently bonded to both R_f and Z, and (a) when n is 1 R′ is selected from
(i) -C_1–C_8 alkylene-, -phenylene-, -C_1–C_8alkylene- R_1-C_1-$_8$alkylene-, -C_3–C_8 alkylene-R_1-, -C_{1-2}alkylene-R_1″–-R_1-C_{1-8}alkylene, -R_1-C_{1-8}alkylene-R_1′-, -R_1-, -R_1-phenylene-, -R_1-phenylene-R_1′-, -R_1-phenylene-C_{1-8} alkylene, and -phenylene-R_1- wherein in each case, said alkylene is straight, or branched, or cyclic and in each case said alkylene and phenylene are independently unsubstituted or substituted by hydroxy, halo, nitro, carboxy, C_{1-6} alkoxy, amino, C_{1-6} alkanoyl, C_{1-6} carbalkoxy, C_{1-6} alkanoyloxy, or C_{1-6} alkanoylamino and said R_1 and R_1′ - are each independently selected from —NR_2—, —CO—, —$N(R_2)$CO—, —CON(R_2)—, —$N(R_2)$COO—, —OOCN(R_2)—, —S—, —SO—, —SO_2—, —$N(R_2)SO_2$—, —$SO_2N(R_2)$—, —$N(R_2)$CON(R_2)—, —COO—, —OOC—, —SO_2O—, —OSO_2—,



—O—; and

R_1″ is selected from —NR_2—, —CO—, —$N(R_2)$CO—, —CON(R_2)—, —NR_2COO—, —OOCN(R_2)—, —S—, —SO—, —SO_2—, —$N(R_2)SO_2$—, —$SO_2N(R_2)$—, —$N(R_2)$CON(R_2)—, —COO—, —SO_2O——OSO_2—, —OSO_2O—, —OCOO—,



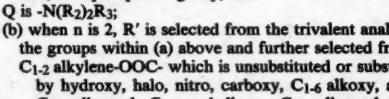
R_2 is H, C_{1-6} alkyl which is unsubstituted or substituted by C_{1-6} alkoxy, halo, hydroxy, carboxy, C_1–C_6 carbalkoxy, C_{1-6} alkanoylamino, or C_{1-6} alkanoyloxy; or the nitrogen to which R_2 is attached is quaternized by further being bound to R_3 which R_3 is H, C_{1-6} alkyl hydroxy- C_{1-6} alkyl, C_{1-6} alkoxy′C_{1-6} alkanoyloxy, or C_{1-6} carbalkoxy, the charge of the quaternized nitrogen being balanced by an anion; and
(ii) an ionically bridged group of the formulae

$$—(R_a')_sQ^{\oplus}\ominus T\ (R_b')_t \qquad (II)$$

or

$$—(R_a')_sT^{\ominus}\oplus Q\ (R_b')_t \qquad (III)$$

wherein
Ra′ is -C_{1-8} alkylene-, -phenylene-, -C_{3-8} alkylene -R_1-C_{1-8} alkylene-, -R_1-C_{3-8} alkylene-, -R_1-phenylene-, or -R_1-phenylene-C_{1-8} alkylene-; R_b′ is -C_{1-8} alkylene-, -phenylene-, -C_{1-8} alkylene -R_1- C_{1-8} alkylene-, -C_{1-8} alkylene-R_1-, -phenylene-R_1-, or -C_{1-8} alkylene-phenylene-R_1-; S and T are each independently zero or 1; and within said R_a′ and R_b′, said alkylene and phenylene groups are unsubstituted or substituted by hydroxy, halo, nitro, carboxy, C_{1-6} alkoxy, amino, C_{1-6} alkanoyl, C_{1-6} carbalkoxy, C_{1-6} alkanoyloxy, or C_{1-6} alkanoylamino;
T is a phenolic hydroxyl residue, carboxy, a sulfoxy, a sulfato, or a phosphono group; and
Q is -$N(R_2)_2R_3$;
(b) when n is 2, R′ is selected from the trivalent analogs of the groups within (a) above and further selected from C_{1-2} alkylene-OOC- which is unsubstituted or substituted by hydroxy, halo, nitro, carboxy, C_{1-6} alkoxy, amino, C_{1-6} alkanoyl, C_{1-6} carbalkoxy, C_{1-6} alkanoyloxy, or C_{1-6} alkanoylamino and still further selected from radicals of the formula



(IV)

where u, v, and w are independently 0 or 1 and R_0 is alkanetriyl, arenetriyl, or aralkanetryl, each having up to 18 carbon atoms and each being uninterrupted or interrupted by —O—, —S—, or —$N(R_2)$—; and
(c) when n is 3, R′ is selected from the tetravalent analogs of the groups within (b) above; and
Z is a hydrocarbyl containing residue having a valency of n and is sufficiently oleophilic so as to impart an oil solubility to said compounds of at least 10 parts per million by weight of said asphaltenic crude oil.

4,876,019

INTERNAL MOLD RELEASE COMPOSITIONS

Louis W. Meyer; James A. Vanderhider, and Robert Carswell, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 466,826, Feb. 16, 1983, abandoned. This application Jan. 12, 1984, Ser. No. 570,141

Int. Cl.[4] C10M *105/58;* C08K *5/09;* C08L *75/04, 75/02*

U.S. Cl. 252—32.5 32 Claims

1. An internal and mold release composition which comprises

(A) at least 1% by weight of said composition of at least one metal salt of an organic material containing at least one carboxylic acid group or mixture of such materials; wherein said metal is selected from Groups I-B, II-B, III-, IV-B, V-B, VI-B, VII-B or VIII-B of the Periodic Table of the Elements, Sn, Pb, Sb or Bi and wherein said organic material contains at least one terminal or pendant saturated or unsaturated aliphatic hydrocarbon chain containing at least about 7 carbon atoms;

(B) a material resulting from aminating a material prepared by reacting an initiator compound having from 2 to about 4 reactive hydrogen atoms with propylene oxide, a combination thereof in any order or a mixture thereof, said product having an average molecular weight of from about 200 to about 6000; an aromatic diamine selected from the group consisting of 1- methyl-3,5-diethyl-2,4-diaminobenzene, 1-methyl-3,5-diethyl2,6-diaminobenzene, 3,5,3',5'-tetraisopropyl-4,4'diaminophenylmethane, and 2,4-bis(paraamino-benzyl)aniline; or mixtures thereof; and

(C) at least one organic material containing at least one carboxylic acid group, phosphorus-containing acid group or boron-containing acid group or mixture of such materials; wherein said organic material contains a siloxane chain or contains at least one terminal or pendant saturated or unsaturated aliphatic hydrocarbon chain containing at least about 7 carbon atoms.

6. An internal mold release composition which comprises

(A) at least 1% by weight of said composition of at least one metal salt of an organic material containing at least one carboxylic acid group or mixture of such materials; wherein said metal is selected from Groups I-B, II-B, III-A, IV-B, V-B, Vi-B, VII-B or VIII-B of the Periodic Table of the Elements, Sn, Pb, Sb or Bi and wherein said organic material contains at least one terminal or pendant saturated or unsaturated aliphatic hydrocarbon chain containing at least about 7 carbon atoms;

(B) a material resulting from animating a material prepared by reacting an initiator compound having from 2 to about 4 reactive hydrogen atoms with propylene oxide, a combination thereof in any order or a mixture thereof, said product having an average molecular weight of from about 200 to about 6000; an aromatic diamine selected from the group consisting of 1- methyl-3,5-diethyl-2,4-diaminobenzene, 1-methyl-3,5-diethyl-2,6-diaminobenzene, 3,5,3'5'-tetraisopropyl-4,4'-diaminophenylmethane, and a 2,4-bis(paraamino-benzyl)aniline; or mixtures thereof; and

said composition being devoid of

(C) at least one organic material containing at least one carboxylic acid group, phosphorus-containing acid group or boron-containing acid group or mixture of such materials; wherein said organic material contains a siloxane chain or contains at least one terminal or pendant saturated or unsaturated aliphatic hydrocarbon chain containing at least about 7 carbon atoms.

4,876,020

LUBRICATING OIL COMPOSITION

Arie Van Zon, and Brian Coleman, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 21, 1988, Ser. No. 209,607

Claims priority, application United Kingdom, Jun. 25, 1987, 8714922

Int. Cl.[4] C10M *129/50, 129/54*

U.S. Cl. 252—40.5 18 Claims

1. A lubricating oil composition comprising hydrocarbon oil or ester or mixtures thereof as a lubricating base oil, one or more overbased alkaline earth metal salts of an aromatic carboxylic acid effective to improve the detergent properties of the composition and an effective amount of a stabilizing agent which is selected from polyalkoxylated alcohol, having a molecular weight of 150–1500.

4,876,021

LUBRICATING OIL COMPOSITIONS CONTAINING ANTI-WEAR/ANTI-CORROSION

Sean P. O'Connor, Beverley, England, assignor to BP Chemicals Limited, London, England

PCT No. PCT/GB88/00023, § 371 Date Aug. 26, 1988, § 102(e) Date Aug. 26, 1988, PCT Pub. No. WO88/05459, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 14, 1988, Ser. No. 238,336

Claims priority, application United Kingdom, Jan. 15, 1987, 8700834

Int. Cl.[4] C10M *135/26, 135/22*

U.S. Cl. 252—48.2 9 Claims

1. A finished lubricating oil composition comprising a lubricating oil base stock and an extreme pressure/antiwear improving amount of a bisacyl- or bisaroyldisulphide.

4,876,022

METHOD FOR PREPARING FERROMAGNETIC IRON OXIDE PARTICLES

Nobuo Yamazaki, and Tatsuji Kitamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 10, 1986, Ser. No. 928,487

Claims priority, application Japan, Nov. 8, 1985, 60-249018

Int. Cl.[4] C04B *35/26*

U.S. Cl. 252—62.56 5 Claims

1. A method for preparing ferromagnetic iron oxide particles comprising the steps of depositing Co-ferrite fine particles onto the surface of acicular iron oxyhydroxide particles and then dehydrating, reducin, and oxidizing said acicular iron oxyhydroxide having said Co-ferrite fine particles deposited thereon.

4,876,023

LAUNDRY PRODUCTS

Haydn G. W. Dickenson, and David H. Huntington, both of Newcastle upon Tyne, England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 17, 1988, Ser. No. 195,062

Claims priority, application United Kingdom, May 23, 1987, 8712285

Int. Cl.[4] C11D *17/00*

U.S. Cl. 252—90 7 Claims

1. A laundry product which consisting of a particulate laundry composition releasably contained within a closed, single- or multi-compartment sachet having a frangible seal, the sachet being formed of a water-insoluble, calender-bonded or calender-finished non-woven bonded substrate material which is a thermo-bonded fibrous or filamentous substrate wherein the fibers or filaments are of polyester or a polyester core bonded with a polyethylene sheath.

4,876,024

ENZYMATIC DETERGENT ADDITIVE, A DETERGENT, AND A WASHING METHOD

Michiyo Enomoto, Tokyo, Japan, and Steen Riisgaard, Ballerup, Denmark, assignors to Novo Industri A/S, Novo Alle, Denmark

Filed Aug. 6, 1986, Ser. No. 893,879
Claims priority, application Denmark, Aug. 7, 1985, 3588/85
Int. Cl.[4] C11D *3/386;* C12N *9/20*
U.S. Cl. 252—174.12 11 Claims

1. A lipolytic enzymatic detergent additive in the form of a non-dusting granulate or a stabilized liquid, the active enzyme component of which is a lipase produced by a lipase producing strain of *Pseudomonas cepacia* said lipase being characterized by a pH activity optimum within the pH range of pH 5.75–7.0 and by being thermally stable at 60° C.

8. A detergent composition containing therein a lipolytic enzymatic additive, the enzyme component of which is a lipase produced by a lipase producing strain of *Pseudomonas cepacia,* said lipase being characterized by a pH activity optimum within the pH range of pH 5.75–7.0 and by being thermally stable at 60° C.

4,876,025

COMPOSITION TO ABSORB MERCURY

Richard H. Roydhouse, Vancouver, Canada, assignor to EPS Environmental Protection Systems Limited, Vancouver, Canada

Continuation of Ser. No. 914,805, Oct. 3, 1986, abandoned. This application May 6, 1988, Ser. No. 191,724
Int. Cl.[4] C09K *3/32*
U.S. Cl. 252—182.32 6 Claims

1. A composition to absorb mercury vapor and to suppress the formation of mercury vapor, the composition being free of thiosulfate and consisting essentially of:

(a) an iodide of a cation; and

(b) a polyhydric alcohol, the iodide and the polyhydric alcohol being present in amounts sufficient to suppress the formation of and absorb mercury vapor.

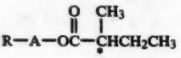
4,876,026

OPTICALLY ACTIVE-2-METHYLBUTYRATE AND MATERIALS USING THE SAME

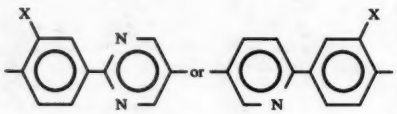
Shinichi Saito; Hiromichi Inoue; Kazutoshi Miyazawa; Kouji Ohno, and Makoto Ushioda, all of Kanagawa, Japan, assignors to Chisso Corporation, Ohsaka, Japan

Filed Dec. 15, 1987, Ser. No. 134,295
Claims priority, application Japan, Dec. 26, 1986, 61-313308
Int. Cl.[4] G02F *1/13;* C09K *19/34;* C07D *239/02, 211.72, 211.84*
U.S. Cl. 252—299.61 5 Claims

1. An optically active-2-methylbutyrate expressed by the formula



wherein R represents a linear or branched chain alkyl group or alkoxy group, each of 4 to 12 carbon atoms; A represents



wherein X represents F or H; and * indicates an optically active carbon atom.

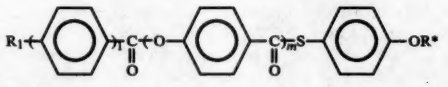
4,876,027

OPTICALLY ACTIVE COMPOSITION, MESOMORPHIC COMPOUND AND LIQUID CRYSTAL DEVICE

Kazuo Yoshinaga, Machida; Kazuharu Katagiri, Tama; Toyoko Kobayashi, Kawasaki, and Kenji Shinjo, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 900,712, Aug. 27, 1986, abandoned. This application Jan. 27, 1989, Ser. No. 302,145
Claims priority, application Japan, Sep. 4, 1985, 60-193831; Dec. 19, 1985, 60-284240
Int. Cl.[4] G02F *1/13;* C09K *19/20, 19/12, 19/06;* C07C *153/07*
U.S. Cl. 252—299.65 38 Claims

1. A mesomorphic compound represented by the following formula:



wherein R_1 is an alkyl group having 6–12 carbon atoms, R* is an alkyl group having 4–12 carbon atoms including an asymmetric carbon atom, 1 is 1 or 2, and m is 0 or 1.

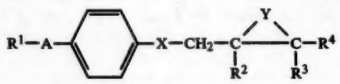
4,876,028

CHIRAL ARYL-2,3-EPOXYALKYL-ETHERS AND THE CORRESPONDING THIO COMPOUNDS THEREOF, AND THE USE THEREOF AS DOPES IN LIQUID-CRYSTAL PHASES

Wolfgang Hemmerling, Sulzbach; Hans-Rolf Dübal, Hofheim am Taunus; Ingrid Müller, Hofheim am Taunus; Dieter Ohlendorf, Liederbach, and Rainer Wingen, Hattersheim am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 2, 1987, Ser. No. 104,350
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1986, 3633968
Int. Cl.[4] C07D *239/02, 241/00;* C09K *19/34;* G02F *1/13*
U.S. Cl. 252—299.61 10 Claims

1. A chiral compound of the formula (I)



(I)

wherein

R^1 is straight-chain or branched (C_1–C_{12}) alkyl, where one or two non-neighboring CH_2 groups may be replaced by O and/or S atoms,

A is diazine-2,5-diyl or diazine-3,6-diyl,

X and Y are O and/or S, and

R^2, R^3 and R^4, independently of one another are H, straight-chain (C_1–C_{10})alkyl or branched (C_3–C_{10})alkyl, where R^2, R^3 and R^4 are not simultaneously H.

5. A twistable liquid-crystal mixture comprising at least one chiral compound of the formula (I) as claimed in claim 1 and a compound having nematic, cholesteric or tilted smectic phases.

4,876,029

SUBSTITUTED AND UNSUBSTITUTED RING-BRIDGED PARA-OLIGOPHENYLENE UV LASER DYES

Hans Güsten, Speyer; Hans-Joachim Ache, Karlsruhe; Monika Rinke, Eggenstein-Leopoldhafen, and Hermann O. Wirth, Bensheim, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe Gesellschaft mit Beschränkter Haftung, Karlsruhe, Fed. Rep. of Germany

Filed Nov. 23, 1984, Ser. No. 674,403

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1984, 3408028

Int. Cl.[4] C09K *11/06*

U.S. Cl. 252—301.17 18 Claims

1. A laser dye capable of stimulated coherent emission in the range below 400 nm comprising ring-bridged p-oligophenylenes having at least 4 and no more than 8 phenyl groups, and having at least one bridge between two adjacent phenyl groups but no more than one bridge between any two adjacent phenyl groups.

4,876,030

ORGANOPHILIC CLAY SUSPENSION MEDIUM

George G. Dixon; Robert M. Parlman, both of Bartlesville, Okla., and Wayne Stewart, Coffeyville, Kans., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 12, 1987, Ser. No. 119,608

Int. Cl.[4] B01J *13/00;* C09K *7/06;* C10M *113/16*

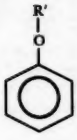
U.S. Cl. 252—315.2 12 Claims

1. An improved liquid suspension medium for particulate solids said suspension medium having been formed by admixing

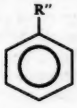
(a) an organophilic clay wherein the clay is selected from the group consisting of bentonite, attapulgite, sepiolite and hectorite and admixtures thereof present in the quantity of about 0.5–8 weight percent with

(b) a liquid hydrocarbon present in the quantity of about 99–70 weight percent and

(c) at least one activator selected from the group consisting of phenyl hydroxyalkyl ethers which are represented by the formula



where R′ is a hydroxyalkyl of from 1 to 4 carbon atoms and phenylalkanols which are represented by the formula



where R″ is an alkanol of from 1 to 6 carbon atoms and admixtures thereof present in the quantity of about 4–7 weight percent.

4,876,031

PARTIAL OXIDATION PROCESS

Mitri S. Najjar, Hopewell Junction, and Roger J. Corbeels, Wappingers Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 51,982, May 19, 1987, Pat. No. 4,826,627. This application Feb. 29, 1988, Ser. No. 161,581

Int. Cl.[4] C10J *3/46*

U.S. Cl. 252—373 33 Claims

1. A process for the production of gaseous mixtures comprising H_2+CO by the partial oxidation of a feedstock comprising a low silicon-containing heavy liquid hydrocarbonaceous fuel having a nickel and vanadium-containing ash, or a low-silicon containing petroleum coke having a nickel and vanadium-containing ash, or mixtures thereof; and said feedstock includes a minimum of 0.1 wt. % of sulfur, and less than about 350 parts per million of silicon; and said ash includes a minimum of 1.0 wt. % vanadium, and a minimum of 1.0 wt. % of nickel; said process comprising:

(1) mixing together an iron-containing additive with said feedstock; wherein the weight ratio of iron-containing additive to ash in the reaction zone in (2) is in the range of about 0.1–10.0 to 1.0, and there is at least 2 parts by weight of iron for each part by weight of vanadium;

(2) reacting said mixture from (1) at a temperature in the range of about 2100° F. to 3000° F. and at a pressure in the range of about 2 to 250 atmosphere in a free-flow vertical refractory lined partial oxidation zone with a free-oxygen containing gas in the presence of a temperature moderator and in a reducing atmosphere to produce a hot raw effluent gas stream comprising H_2+CO and entrained molten slag; wherein said refractory lining comprises in weight percent: MgO 85 to 98, Fe_2O_3 0.03 to 3.0; Al_2O_3 0.02 to 2.0, CaO 0.1 to 10 and SiO_2 0.02 to 2.0; and where in said reaction zone a first portion of the said iron-containing additive combines with at least a portion of the nickel, iron and sulfur constituents found in the feedstock and refractory components to produce a first liquid phase washing agent substantially comprising in wt. % iron about 40 to 80; nickel about 0.1 to 5; and sulfur about 10 to 32; and optionally a minor amount of at least one element selected from the group consisting of Al, Ca, V, Si, Ti, Mg, Mn, Na, K and mixtures thereof; a second portion of said iron-containing additive combines with at least a portion of the silicon, aluminum, calcium, sodium and/or potassium, and iron constituents found in the feedstock and refractory components to produce a second liquid phase washing agent substantially comprising in wt. %: iron about 5 to 40; magnesium about 0.01 to 2.0; aluminum about 5 to 20; silicon about 20 to 50; calcium about 1.0 to 35; and sodium and/or potassium about 0.01 to 5; and wherein the first and second liquid phase washing agents collect and transport at least a portion of the vanadium-containing oxide laths and spinels and other ash and refractory components out of the reaction zone as said molten slag, and said molten slag combines with a portion of said refractory in the amount of about 0.001 to 2.0 wt. % of the weight of said iron-containing additive to produce localized vanadium-containing spinels and substantially no interlocking laths; and

(3) separating nongaseous materials from said hot raw effluent gas stream.

4,876,032

PROCESS FOR INTRODUCING ELECTRICAL CONDUCTIVITY INTO HIGH-TEMPERATURE POLYMERIC MATERIALS

Raimond Liepins, Los Alamos; Betty S. Jorgensen, Jemez Springs, and Leila Z. Liepins, Los Alamos, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 27, 1987, Ser. No. 91,251

Int. Cl.[4] H01B 1/00

U.S. Cl. 252—500 10 Claims

1. A process for introducing electrical conductivity into bulk samples of high-temperature polymeric materials which comprises the steps of:

preparing a solution of the polymer in a solvent;

adding a solution of $AgNO_3$ in a solvent;

adding a solution of an aldehyde in a solvent; and

drying the resulting solution.

4,876,033

MOULDED BODIES CONTAINING CARBON

Heinz-Jürgen Dziurla, Leverkusen; Dieter Freitag, Krefeld; Werner Waldenrath, Cologne; Claus Burkhardt, and Bernhard Schulte, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Bayerwerk, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 55,675, May 29, 1987, abandoned. This application Apr. 25, 1988, Ser. No. 185,606

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1986, 3619094; European Pat. Off., May 29, 1987, 87107784; Japan, Jun. 10, 1987, 62-143419

Int. Cl.[4] C08J 3/20; C08K 3/04

U.S. Cl. 252—511 8 Claims

1. A process for the production of articles comprising

(i) intimately mixing a thermoplastic polycarbonate with a first mixture of carbon black and graphite powder or dust to produce a second mixture,

(ii) working up said second mixture under degassing conditions to produce a granulate,

(iii) mixing said granulate with a thermoplastic polyalkylene terephthalate to produce a blend,

(iv) molding said blend by extrusion or by injection,

said blend comprising 55 to 85% thermoplastic polycarbonate, 5 to 30% polyalkylene terephthalate and 10 to 35% said first mixture, said first mixture being characterized in that the weight ratio of said carbon black to said graphite is in the range of from 5:1 to 1:3 and said graphite being characterized in that its average particle size is up to 5 mm.

4,876,034

SECONDARY AMIDOAMINO ACID BASED DETERGENT COMPOSITION

Hajime Hirota, Tokyo; Hidekazu Ogino, Koutoubashi; Sahoko Igarashi, Tokyo, and Kohshiro Sotoya, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

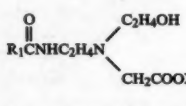
Filed Oct. 29, 1987, Ser. No. 114,201

Claims priority, application Japan, Nov. 18, 1986, 61-274927; Dec. 24, 1986, 61-310431

Int. Cl.[4] C11D 1/10, 1/88

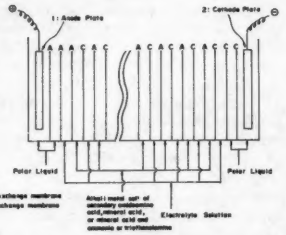
U.S. Cl. 252—546 3 Claims

1. A detergent composition comprising as a main detergent active ingredient a secondary amidoamino acid or its salts of the following formula (I):



(I)

wherein R_1 represents an alkyl group, a hydroxyalkyl group, an aralkyl group or an alkenyl group each having from 7 to 23 carbon atoms, and X represents hydrogen, ammonium ion or a triethanolammonium ion; with the content of a water-soluble inorganic salt being 0.2 mol or less per 100 g of said secondary amidoamino acid, calculated as the acid type secondary amidoamino acid when the salts are used.



4,876,035

AQUEOUS PREPARATIONS OF SODIUM LAURYL SULFATE AND MYRISTYL SULFATE HAVING A LOW CLOUD POINT USEFUL IN MAKING TOOTHPASTES

Willi Breitzke, Duesseldorf, and Hermann Hensen, Hilden, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 3, 1987, Ser. No. 57,468

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1986, 3619358

Int. Cl.[4] A61K 7/16; C11D 1/14, 1/83, 3/43

U.S. Cl. 252—550 18 Claims

1. A clear, aqueous liquid preparation having a cloud point below about 6° C., said preparation consisting essentially of; from about 5 to about 20% by weight of sodium lauryl sulfate and/or myristyl sulfate, from about 10 to about 30% by weight of a surface-active nonionic ethylene oxide adduct having an HLB-value of from about 12 to about 18, from about 10 to about 20% by weight of a polyol containing from about 3 to about 6 carbon atoms and from about 2 to about 6 hydroxyl groups or a polyethylene glycol, and from about 30 to about 75% by weight of water, based on the weight of the preparation.

4,876,036

PROCESS FOR THE EXTRACTION OF CATIONS AND APPLICATION THEREOF TO THE TREATMENT OF AQUEOUS EFFLUENTS

Sauveur Candau; Maurice Leroy; Jean-Pierre Brunette, all of Strasbourg; Paul Mallo, Rueil Malmaison; Jean-Francois Loret, Strasbourg, and Gilles Waton, Strasbourg, all of France, assignors to Societe Chimique des Charbonnages S.A., France

Filed Dec. 18, 1987, Ser. No. 134,845

Claims priority, application France, Dec. 19, 1986, 86-17791

Int. Cl.[4] C21F 9/08, 9/16; C01G 56/00, 57/00

U.S. Cl. 252—637 16 Claims

1. A process for the extraction of cations from an aqueous effluent containing cations comprising the step of introducing into an aqueous effluent containing cations an effective quantity of at least one polymer or copolymer being physically or chemically crosslinked and based on one or more units selected from the group consisting of salified acrylic acid, quaternized acrylic acid, and a copolymer comprising from 40 to 60 mole % of acrylic acid and from 60 to 40 mole % of at least one dialkylaminoalkyl acrylate in which each alkyl group contains from 1 to 4 carbon atoms.

4,876,037

CONTACT TOWER AND METHOD OF ASSEMBLY

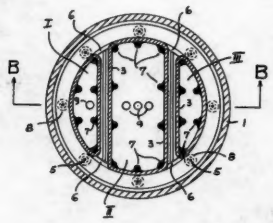
Max Leva, 1600 Munhall Rd., Pittsburgh, Pa. 15217

Filed Nov. 4, 1988, Ser. No. 267,353

Claims priority, application United Kingdom, Nov. 20, 1987, 8727234

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—113 20 Claims



1. The method of assembling a gas-liquid contact tower shell, a stack of superimposed, substantially flat, horizontal trays spaced vertically apart within the shell so that in use each can carry a thin film of liquid discharged within the tower shell, the horizontal trays being provided with a plurality of flow apertures distributed substantially uniformly over at least part of the surface of the trays, and the apertures being suitable to permit in use the thin liquid film on the trays to flow downwardly therethrough from tray to tray and to permit gas to flow upwardly therethrough from tray to tray; the method comprising forming a plurality of separate, preassembled, segmental tray sub-assemblies by separately enclosing segmental portions of each tray with surrounding sectional spacer bands so shaped that a plurality of said sectional spacer bands in side-by-side relationship will form a circle defining the outer periphery of each tray.

4,876,038

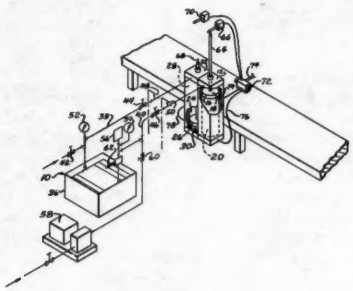
APPARATUS FOR MAKING A POST-FOAMING GEL

Paul Wigglesworth, Manchester, and Roger D. Ellis, Lancashire, both of Great Britain, assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Dec. 10, 1987, Ser. No. 131,126

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—152 12 Claims



1. An apparatus for making post-foaming gel, comprising:

a first cylinder having a chamber and a slidable piston separating the chamber into a first compartment to receive a gel base and a second compartment;

a second cylinder having a chamber and a slidable piston separating the chamber into a first compartment to receive the gel base and a second compartment;

conduit means connecting the first compartments of the first and second cylinders;

means for reciprocating the pistons in the first and cylinders to cycle the gel base through the conduit means between the first compartments of the first and second cylinders; and

means for introducing a foaming agent to the gel base while it is being cycled between the cylinders wherein the reciprocating means comprises means for sequentially introducing a compressed gas into the second compartments of the first and second cylinders.

4,876,039

PROCESS FOR PREPARING SILICONE MICROPARTICLES CURED BY A MICHAEL ADDITION REACTION

Peter Y. K. Lo, and Maris J. Ziemelis, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation of Ser. No. 926,763, Nov. 4, 1986, abandoned. This application May 19, 1988, Ser. No. 195,928

Int. Cl.[4] A61K *9/58;* B01J *13/02;* C08G *77/26*

U.S. Cl. 264—4.7 31 Claims

1. A process for preparing microspheres of solid organopolysiloxane, said process comprising:

(I) preparing a dispersion of discrete entities in a fluid continuous phase by dispersing, in the continuous phase fluid, a liquid organopolysiloxane composition convertible to a solid state at room temperature by a Michael-type addition reaction, said liquid organopolysiloxane composition being insoluble in the fluid continuous phase and consisting essentially of

(i) an organopolysiloxane having attached thereto through silicon-carbon bonds an average of at least two X groups per molecule, wherein X is a monovalent organic moiety containing at least one —NHR″ radical, wherein R″ is selected from the group consisting of hydrogen and alkyl radicals having 1 to 6 carbon atoms, and

(ii) an organopolysiloxane having attached thereto through silicon-carbon bonds an average of at least two Z groups per molecule, wherein Z is a monovalent organic moiety containing at least one acryl-functional radical which is capable of reacting with said —NHR″ radical, said acryl-functional radical being selected from the group consisting of acryloxy, methacryloxy and acrylamide radicals, at least one of (i) and (ii) having an average of more than two of said X groups and said Z groups, respectively, per molecule; and

(II) curing said organopolysiloxane composition by a Michael-type addition reaction until it is converted to a solid state.

10. A process for preparing microcapsules of an internal material localized as a core in a solid organopolysiloxane, said process comprising:

(II) preparing a dispersion of discrete entities in a fluid continuous phase by dispersing the internal material in the continuous phase fluid and simultaneously or subsequently codispersing therewith a liquid organopolysiloxane composition convertible to a solid state at room temperature by a Michael-type addition reaction and insoluble in the fluid continuous phase, said composition consisting essentially of

(i) an organopolysiloxane having attached thereto through silicon-carbon bonds an average of at least two X groups per molecule, wherein X is a monovalent organic moiety containing at least one —NHR″ radical, wherein R″ is selected from the group consisting of hydrogen and alkyl radicals having 1 to 6 carbon atoms, and

(ii) an organopolysiloxane having attached thereto through silicon-carbon bonds an average of at least two

Z groups per molecule, wherein Z is a monovalent organic moiety containing at least one acryl-functional radical which is capable of reacting with said —NHR" radical, said acryl-functional radical being selected from the group consisting of acryloxy, methacryloxy and acrylamide radicals, at least one of (i) and (ii) having an average of more than two of said X groups and said Z groups, respectively, per molecule; and

(II) curing said organopolysiloxane composition by a Michael-type addition reaction until it is converted to a solid state.

4,876,040

TWO-STAGE PROCESS FOR PREPARING AROMATIC POLYAMIDE FIBER

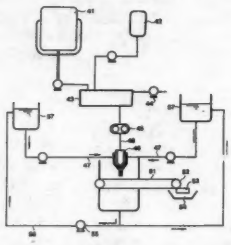
Ho J. Park, Seoul; Moo S. Rhim; Hak M. Kim, both of Kumi; Du H. Kim, Deagu; Seog C. Yoo, Kwangwon; Sang H. Kim, Seoul; Sa Ng B. Park, Gumi; Ink S. Han, Kyungsan; Jong T. Park, and Si M. Kim, both of Daegu, all of Rep. of Korea, assignors to Kolon Industries, Inc., Seoul, Rep. of Korea

Filed Mar. 10, 1987, Ser. No. 24,173

Claims priority, application Rep. of Korea, May 15, 1986, 86-3826; May 15, 1986, 86-3827; Jul. 23, 1986, 86-5983; Jul. 23, 1986, 86-5984

Int. Cl.[4] D01D *5/26;* **D01F** *6/60*

U.S. Cl. 264—14 **21 Claims**



1. A process for preparing aromatic polyamide in the form of fiber which process comprises:

(a) preparing a mixture by adding equivalent moles of an aromatic diamine and an aromatic diacidchloride reactant to a first solvent which is an amide polymerization solvent containing an inorganic salt;

(b) dissolving said diamine and said diacidchloride in said polymerization solvent;

(c) effecting a partial polymerization at a low temperature of the dissolved reactants to form an optically anisotropic liquid crystalline prepolymer dope having an amount of polymer and an inherent viscosity suitable for forming fibers therefrom;

(d) continuously spinning said prepolymer dope into a second solvent which is a polymerization accelerating-precipitation solvent under a spin stretch factor of 1 to 4; and

(e) obtaining aromatic polyamide fibers free of a crystal defect layer perpendicular to the fiber axis and having a high strength and a high degree of molecular orientation.

4,876,041

METHOD FOR FUSION JOINING PLASTIC PIPE

Reinhard Hanselka, Danville, Calif., assignor to Georg Fischer AG, Schaffhausen, Switzerland

Continuation of Ser. No. 919,238, Oct. 14, 1986, abandoned. This application Sep. 14, 1988, Ser. No. 245,929

Int. Cl.[4] B29C *65/02, 57/08, 51/10*

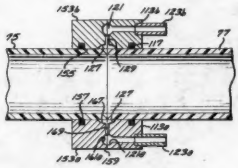
U.S. Cl. 264—25 **10 Claims**

1. A method for fusion joining first and second thermoplastic piping system component connection ends, comprising the steps of:

providing first and second thermoplastic piping system component connection ends respectively having substantially squarely cut terminal edges;

securing the connection ends in axial and circumferential alignment with their edges in abutment forming an interface;

heating a melt region in the proximity of the interface of the



first and second piping system component connection ends at least to the material softening point of the thermoplastic material of the melt region; and

vacuummetrically inducing outward translation of the melted material of the melt region; and

cooling the translated material of the melt region at least to below the material softening point of the melt region, whereby the first and second thermoplastic piping system component connection ends are fusion joined with a smooth inside surface at the interface thereof.

4,876,042

MOLDING PROCESSING USING A REPRODUCIBLE MOLDING DIE

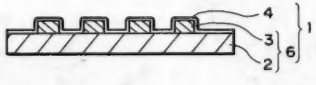
Hiroyuki Imataki; Mizuho Hiraoka, both of Kawasaki; Tomoyuki Tamura, Yokohama, and Tetsuya Satoh, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,456

Claims priority, application Japan, Dec. 28, 1987, 62-334993; Dec. 29, 1987, 62-336066

Int. Cl.[4] B29C *43/36*

U.S. Cl. 264—39 **6 Claims**



1. A molding process, comprising:

providing a reproducible molding die comprising a base structure having an evenness pattern, and a cleaning layer disposed on the surface of the base structure having said unevenness pattern;

molding a product by means of said molding die, while leaving molding residue on the molding die; and

removing said cleaning layer together with the residue from the molding die while substantially retaining said unevenness pattern of the base structure.

4,876,043

HOPPER TRANSPORT FOR INJECTION MOLDING

Richard A. Hall, Sr., Rte. 1, Box 24AC, LaCenter, Wash. 98629

Filed Aug. 23, 1988, Ser. No. 235,433

Int. Cl.[4] B29C *45/18*

U.S. Cl. 264—39 **8 Claims**

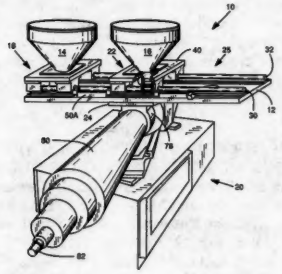
1. A method of feeding polymeric raw materials from a pair

of hoppers into an input opening of an injection molding machine, the method comprising the steps of:

providing an elongate track over the machine upon which each of the hoppers is supported in an upright position for manual sliding movement along the track longitudinal axis independently of the other hopper;

loading raw material into the first hopper;

positioning the first hopper over the input opening to allow material to flow from the first hopper into the input opening to provide raw material for a first injection molding job;



actuating the machine to commence the first job;

while the first job proceeds, positioning the second hopper at a standby position for loading; and

while the first job proceeds, loading the second hopper with raw material to prepare for commencing a second job thereby minimizing machine down-time after completion of the first job.

4,876,044

THIADIAZOLE COMPOUNDS AND METHODS OF USE

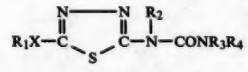
Tony Cebalo, 7244 Sondridge Cir., Indianapolis, Ind. 46205, and Robert E. Buntrock, 546 N. Webster St., Naperville, Ill. 60540

Filed Oct. 2, 1969, Ser. No. 863,338

Int. Cl.[4] A01N *43/82*; C07D *285/12*

U.S. Cl. 71—90 **16 Claims**

1. Compounds having the formula:



wherein

X is a SO_2 radical

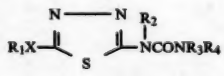
R_1 is a lower alkyl radical having from 1 to 4 carbon atoms,

R_2 is a lower alkyl radical having from 1 to 4 carbon atoms.

R_3 is a lower alkyl radical having from 1 to 4 carbon atoms or an alkoxy radical having from 1 to 4 carbon atoms, and

R_4 is hydrogen or a lower alkyl radical having from 1 to 4 carbon atoms.

8. A herbicidal composition containing an agriculturally acceptable carrier and at least one compound having the formula:



[A]

wherein

X is a SO_2 radical,

R_1 is a lower alkyl radical having from 1 to 4 carbon atoms,

R_2 is a lower alkyl radical having from 1 to 4 carbon atoms,

R_3 is a lower alkyl radical having from 1 to 4 carbon atom or an alkoxy radical having from 1 to 4 carbon atoms, and

R_4 is hydrogen or a lower alkyl radical having from 1 to 4 carbon atoms.

4,876,045

PROCESS FOR THE PREPARATION OF METHYLENE DERIVATIVES OF ANDROSTA-1,4-DIENE-3,17-DIONE

Antonio Longo, and Paolo Lombardi, both of Milan, Italy, assignors to Farmitalia Carlo Erba S.r.l., Milan, Italy

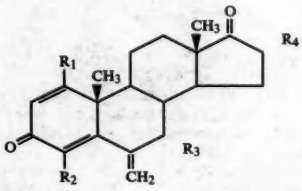
Filed Sep. 12, 1988, Ser. No. 242,854

Claims priority, application United Kingdom, Sep. 11, 1987, 8721383

Int. Cl.[4] C07J *1/00*

U.S. Cl. 260—397.3 **4 Claims**

1. A process for the preparation of a compound of formula (I)



(I)

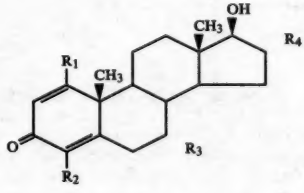
wherein

each of R_1 and R_3, independently, is hydrogen or C_1–C_6 alkyl;

R_2 is hydrogen, halogen or C_1–C_6 alkyl; and

R_4 is hydrogen or fluorine;

the process comprising reacting a compound of formula (II)



(II)

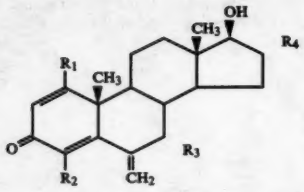
wherein

R_1, R_2, R_3 and R_4 are as defined above, with a formaldehyde source and an amine of formula (III), or a salt thereof,

(III)

wherein

each R group, which may be the same or different, is lower alkyl, so as to obtain a compound of formula (IV)



(IV)

wherein

R_1, R_2, R_3 and R_4 are as defined above, and oxidizing a compound of formula (IV) thus obtained, by methods known per se.

4,876,046

SUBSTITUTED GLUTARIC AND ADIPIC DIPEROXYACIDS

Allen D. Clauss, Fairfield, and Eugene P. Gosselink, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 80,142, Jul. 29, 1987, abandoned, which is a continuation of Ser. No. 744,597, Jun. 14, 1985, abandoned. This application May 11, 1989, Ser. No. 353,182

Int. Cl.[4] C07C *179/00*

U.S. Cl. 8—111 **3 Claims**

1. β-n-hexyldiperoxyadipic acid.

4,876,047

PROCESS FOR PRODUCING SULPHONIC ACID

Gerald Benn; David Farrar, both of Bradford, and Peter Flesher, Bingley, all of United Kingdom, assignors to Allied Colloids Limited, England

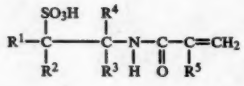
Continuation of Ser. No. 901,968, Aug. 29, 1986, abandoned, which is a continuation of Ser. No. 758,728, Jul. 25, 1985, abandoned. This application Dec. 17, 1987, Ser. No. 136,428

Claims priority, application United Kingdom, Jul. 27, 1984, 8419207

Int. Cl.[4] C07C *143/16*

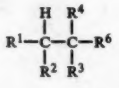
U.S. Cl. 562—41 **12 Claims**

1. A process for making a compound of Formula I



I

wherein R_3 and R_4 are independently selected from C_{1-8} alkyl, substituted aryl, unsubstituted aryl and aralkyl having from 6 to 12 carbon atoms in total, R_1 and R_2 are selected from the same values as R_3 and R_4 and hydrogen, and R_5 is hydrogen or C_{1-6} alkyl from a nitrile of formula $H_2C=C(R^5)CN$ where R^5 is hydrogen or C_{1-6} alkyl and a sulphonating agent characterized in that the process comprises reacting below 20° C. a compound of Formula II



with the sulphonating agent in the substantial absence of water and with the nitrile and hydrolyzing the product by reaction 30° C. with added water to produce the compound of Formula I wherein R^6 selected from the group consisting of hydroxy, alkoxy, acyloxy, halogen, sulphate, aryloxy and aralkoxy.

4,876,048

PURIFICATION OF ALKANESULFONYL CHLORIDES

David M. Gardner, Worcester Township, Montgomery County, Pa.; Gregory A. Wheaton, Logan Township, Gloucester County, N.J., and Martin Nosowitz, Easttown Township, Chester County, Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Dec. 12, 1988, Ser. No. 283,113

Int. Cl.[4] C07C *143/70*

U.S. Cl. 260—543 R **8 Claims**

1. A process for removing odorous and color-forming impurities from alkanesulfonyl chlorides comprising contacting said alkanesulfonyl chlorides with an ozone-containing gas at a temperature ranging from about 0° C. to about 100° C. for a time sufficient to reduce odorous and color-forming impurities therein.

4,876,049

METHOD FOR PREPARING MOLDED ARTICLES OF ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE

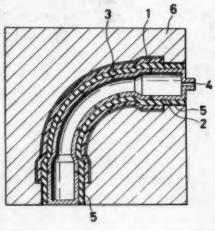
Takeo Aoyama, Yokohama; Teruo Imai, Kawasaki; Junichi Hattori, Yokohama, and Mikio Uehara, Tokyo, all of Japan, assignors to Nippon Petrochemicals Co., Ltd., Japan

Filed Nov. 19, 1986, Ser. No. 932,918

Claims priority, application Japan, Nov. 21, 1985, 60-261874; Dec. 12, 1985, 60-280084; Dec. 12, 1985, 60-280085

Int. Cl.[4] C08J *9/26*; B29C *67/14, 51/28*

U.S. Cl. 264—49 **15 Claims**



1. A method for preparing a molded hollow article of an ultra-high molecular weight polyethylene comprising the steps of providing a mold having a deformable member; positioning a porous sheet of said ultra-high molecular weight polyethylene about said deformable member; applying heat and deforming said deformable member with sufficient pressure to thereby cause said sheet to adhere closely to said mold, whereby said sheet is melted and densified.

6. The method according to claim 1 wherein said porous sheet is prepared by compounding solvent-suluba components with ultra-high molecular weight polyethylene and thereafter removing solvent-soluble components by extraction.

4,876,050

PROCESS FOR DRY FIBER WINDING AND IMPREGNATING OF PROJECTILES

Jack Horton, Marina del Rey, Calif., assignor to Murdock, Inc., Compton, Calif.

Continuation-in-part of Ser. No. 748,337, Jun. 24, 1985, abandoned. This application Oct. 5, 1987, Ser. No. 105,653

Int. Cl.[4] B29C *35/02, 45/02, 45/14*

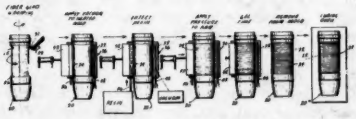
U.S. Cl. 264—102 **9 Claims**

1. A process for making a projectile which is impregnated with resin after winding with fibers in the absence of resin comprising:

providing a projectile for winding with dry fibers in the absence of resin;

providing dry fibers for winding in the absence of resin which are selected from the group consisting of glass,

polyester, carbon, aramid, hybrids of carbon-aramid, hybrids of aramid-glass, hybrids of aramid-glass-carbon, and hybrids of carbon-glass and combinations thereof;
winding at least a portion of said projectile with dry fibers in the absence of resin;
providing a mold;
providing means for opening and closing the mold;
providing means for heating said mold;
providing vacuum means to said mold;
placing the dry fiber wound portion of said projectile into the mold;
closing said mold;
applying a vacuum to said mold;
providing a resin;



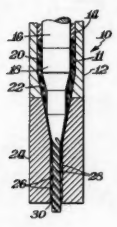
pressure injecting said resin into said mold to impregnate the fibers with the resin;
heating the mold to a temperature and for a time sufficient to cure the resin to the gel stage;
applying said vacuum to said mold prior to and during said pressure injection and heating steps of said process;
keeping said projectile within said mold for a time sufficient to cure the resin just to the gel stage whereby the object can be removed from said mold without disturbing the surface;
opening said mold;
removing said projectile from said mold; and,
allowing the resin to complete its cure.

4,876,051

APPARATUS AND METHOD FOR EXTRUDING AND EXPANDING POLYTETRAFLUOROETHYLENE TUBING AND THE PRODUCTS PRODUCED THEREBY

Michael L. Campbell; Benjamin G. Williams; Rob G. Riffle, and Charles E. Biggerstaff, all of Flagstaff, Ariz., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Division of Ser. No. 930,411, Nov. 13, 1986. This application Dec. 17, 1987, Ser. No. 134,045
Int. Cl.[4] B29C *47/20*
U.S. Cl. 264—127 **18 Claims**



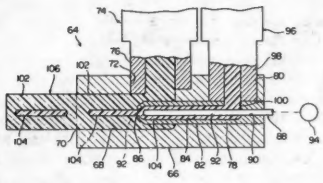
1. A process for extrusion and expansion of PTFE tubing comprising extruding a preformed billet of a mixture of coagulated dispersion of PTFE and liquid lubricant through an extruder comprising a hollow, cylindrical barrel containing a mandrel centrally positioned within said barrel, said barrel having a resin supply region, a tapered region leading from said supply region to an annular outflow region comprising an external, hollow, circular die having positioned centrally therein the circularly cylindrical tip of said mandrel, the tip and die forming an annulus, said tip and die both having at least one groove in the surface thereof, said grooves being oriented helically with respect to the longitudinal axis of said tip and die, the pitch of said helical groove in said tip being oriented opposite the pitch of said helical groove in said die, the apparatus including a ram capable of reciprocation within said barrel and surrounding said mandrel, forcing said PTFE through said annulus, thereby producing extruded, unsintered tubing having at least one helically oriented ridge on at least one surface thereof, followed by removing said lubricant from said extruded tubing, and then expanding said extruded tubing, after the removal of liquid lubricant, by stretching said unsintered tubing longitudinally and maintaining said tubing at a temperature between about 35° C. and the crystalline melt point of said PTFE during said stretching.

4,876,052

METHOD OF EXTRUDING AND COMPRESSION MOLDING A MULTILAYERED ARTICLE

Muneki Yamada, Fujisawa, and Kiyoshi Kawaguchi, Yokohama, both of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Division of Ser. No. 9,974, Feb. 2, 1987. This application Jun. 20, 1988, Ser. No. 208,488
Claims priority, application Japan, Feb. 10, 1986, 61-25832
Int. Cl.[4] B29C *47/02*
U.S. Cl. 264—148 **7 Claims**



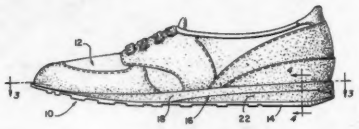
1. A method for producing a compression-molded article having a multilayer structure comprising a first resin layer molded from a first synthetic resin and a second resin layer molded from a second synthetic resin and wherein the first and second resin layers are dissimilar and the first resin layer substantially surrounds the entire second resin layer, said method comprising the steps of:
introducing the first synthetic resin into a main extrusion flow passage,
permitting the first synthetic resin to flow in a heated, molten state in the main extrusion flow passage,
intermittently extruding the second synthetic resin in a heated, molten state into the main extrusion flow passage to provide extruded second synthetic resin which is substantially surrounded, in the main extrusion flow passage, by the first synthetic resin,
extruding the second synthetic resin and the first synthetic resin from an extrusion opening in the main extrusion flow passage to provide extruded second and first synthetic resins forming a composite plastic material comprising the second synthetic resin substantially surrounded by the first synthetic resin and,
compression-molding the composite plastic material to mold the first resin layer from the first synthetic resin and the second resin layer from the second synthetic resin.

4,876,053

PROCESS OF MOLDING A COMPONENT OF A SOLE UNIT FOR FOOTWEAR

Edward J. Norton, Boxford; Craig F. Fram, Haverhill; Kenneth W. Graham, Wakefield, all of Mass., and James A. Smith, St. Louis Park, Minn., assignors to New Balance Athletic Shoe, Inc., Boston, Mass.

Continuation of Ser. No. 897,903, Aug. 19, 1988, abandoned, which is a division of Ser. No. 848,197, Apr. 4, 1986, Pat. No. 4,730,402. This application Jul. 26, 1988, Ser. No. 224,247
Int. Cl.[4] A43B *10/00*
U.S. Cl. 264—255 5 Claims



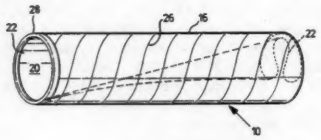
1. The process of molding a component of a sole unit for an athletic shoe comprising the steps of supporting a core of a first plastic material having a first hardness (Shore A) in a cavity of a mold, said core defining an integral part of said component and being of a size to extend within a heel region toward the forefoot region of the same, supporting at least one rigid plug member within said cavity juxtaposed and in partially surrounding relation to said core, said at least one plug member serving the function of a dummy plug to prevent a build up of an injected plastic material within regions then occupied by said at least one plug member, injecting a second plastic material into said cavity to fill said cavity to form a shell around said core, at least partially curing said injected plastic injecting a third plastic material which upon curing forms a second resilient plastic material having a second hardness (Shore A) greater than that of the material of said core into said cavity to fill the area heretofore occupied by said plug that said third plastic material forms a set of posts including a lateral post on one side of said core and a medial post on the other said of said core with both posts extending along said core from the heel region, and such that the inner surface of at least one of said posts partially describes the interior outline of said core, and such that the upper surface of at least one of said posts corresponds to an upper surface of said component.

4,876,054

CONCRETE FORMING METHOD

Paul Goodwin, Mississauga, Canada, assignor to Perma Tubes Ltd., Raleigh, N.C.

Continuation of Ser. No. 853,375, Apr. 15, 1986, abandoned, which is a continuation of Ser. No. 698,115, Feb. 4, 1985, abandoned, which is a division of Ser. No. 583,165, Feb. 24, 1984, Pat. No. 4,595,168. This application Feb. 24, 1988, Ser. No. 161,294
Claims priority, application Canada, Feb. 20, 1984, 447831
Int. Cl.[4] B28B *1/00*
U.S. Cl. 264—333 2 Claims



1. A method of fabricating a concrete column with a form having a helical wound construction without forming helical lines on or staining the column, comprising the steps of:

providing a rigid elongated concrete column forming tube having an inside, generally-cylindrical wall defining an enclosure that has a preselected inside circumferential dimension and into which concrete can be poured and allowed to harden into a concrete column, said concrete column forming tube of a type comprising helically wound layers of paper sheet material defining a marking pattern transferrable to said column;

providing a discrete sheet of a flexible resilient and water impermeable material having a width dimension between opposite lateral edges which corresponds to said preselected inside circumferential dimension of the rigid elongated concrete column forming tube, and having a thickness to preclude form lines corresponding to the helical marking pattern of the rigid elongated concrete column forming tube from forming on a hardened concrete column formed thereby;

bending the sheet onto itself such that the lateral edges of the sheet in the bent condition are adjacent each other in butting relationship with two folds projecting outwardly therefrom;

interconnecting the lateral edges of the sheet in such a way as to seal the butting lateral edges to form a discrete, substantially water impermeable liner;

bending the discrete liner to permit insertion into the rigid elongated concrete column forming tube;

inserting the bent discrete liner into the rigid elongated concrete column forming tube;

causing the discrete liner to expand in the concrete column forming tube such that the outside surface of the liner is everywhere in pressing engagement against and lines the inside wall of the rigid elongated concrete column forming tube without being bonded thereto; and

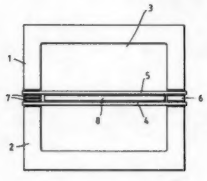
pouring concrete into the disposable concrete column forming tube with inserted liner to form a concrete column of a type without undesirable helical form lines caused by the helical pattern of the concrete column forming tube, and without staining caused by water reabsorption back through the concrete column forming tube onto the concrete column formed by the tube.

4,876,055

SHAPING OF SYNTACTIC FOAM

James B. Cattanach, Middlesbrough, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Feb. 1, 1988, Ser. No. 151,283
Int. Cl.[4] B29C *51/28, 47/06, 67/16*
U.S. Cl. 264—512 8 Claims



1. A method of forming a shaped article of preformed, thermoplastic, syntactic foam material of hollow microspheres in a thermoplastic polymer matrix comprising:

(a) contacting at least one source of the preformed syntactic foam with a plastically deformable diaphragm member;

(b) heating the assembled foam and diaphragm member to a temperature above the softening point of the thermoplastic polymer matrix;

(c) applying differential pressure across the assembled foam and diaphragm member to cause the foamed material to conform to a desired shape; and

(d) allowing the shaped foam to cool to a temperature below said softening point whereby the foam retains the desired shape.

4,876,056

FLOW MEASUREMENT

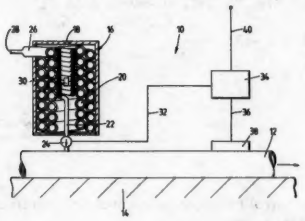
Colin G. Clayton, Tregaron, and Ramon Spackman, Didcot, both of United Kingdom, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Nov. 9, 1987, Ser. No. 117,831

Claims priority, application United Kingdom, Nov. 24, 1986, 8628055

Int. Cl.[4] G21G *1/06;* G21H *5/00*

U.S. Cl. 376—152 **2 Claims**



1. A method for measuring the flow of a fluid in a duct having at least a length thereof immersed in a saline sea, the method comprising locating a container adjacent to said duct with said container having an inlet communicating with said sea to allow ingress, as a test fluid, of sea water from said sea, causing said test fluid to enter said container, storing said test fluid in said container, irradiating said test fluid in said container with neutrons so as to generate atoms of a predetermined radioactive nuclide in said test fluid, injecting at spaced time intervals a sample of the irradiated test fluid from said container into said duct, detecting, at a location spaced apart along said duct from the location at which the injection takes place, radiation emitted by said predetermined radioactive atoms, and determining, from the elapsed time between the injection of the test fluid and the detection of the radiation, the flow rate of the fluid.

4,876,057

CONTROL PROCESS FOR A NUCLEAR REACTOR

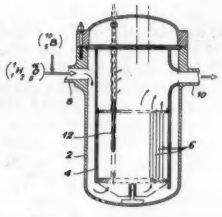
Patrice Bernard, Venelles; Laurent Sauvage; Henri Girard, both of Pertuis, and Jean-Pierre Ferrero, Aix en Provence, all of France, assignors to Commissariat a L'Energie Atomique, Paris, France

Filed Apr. 13, 1988, Ser. No. 181,043

Claims priority, application France, Apr. 24, 1987, 87 05824

Int. Cl.[4] G21C *7/36*

U.S. Cl. 376—216 **15 Claims**



1. Process for the control of a nuclear reactor having a core containing fissile material assemblies, the fission of the nuclei of said materials being brought about by interactions with neutrons and producing in turn neutrons, said nuclear reactor also having a means for regulating the neutron flux in the reactor core and the power given off by said reactor core, said regulating means comprising at least one assembly of control rods displaceable in said reactor core, said process being characterized in that:

(A) iteratively there is a determination of the neutron fluxes $\phi(j,g)$ for each zone or mesh j $1 \leqq j \leqq J$ of a group of meshes corresponding to the volume of the reactor core and for each velocity group g $1 \leqq g \leqq G$ of a plurality of velocity groups for the neutrons; and the numbers of neutrons or sources S(j) emitted by each mesh j, $1 \leqq j \leqq J$, per volume and time unit, the determination of said values consisting of repeating the following sequence of operations until said values converge:

(a) calculation of the first components of the neutron flux $\phi^0(j,g)$, $1 \leqq j \leqq J$ as a function of the predetermined coupling matrixes $[\psi g]$ $1 \leqq g \leqq G$ and sources S(j), each element $\psi g(j,k)$, $1 \leqq k \leqq K$ and $1 \leqq j \leqq J$ expressing for neutrons of the velocity group g $1 \leqq g \leqq G$, the coupling between the mesh j and the adjacent meshes k corresponding to predetermined interaction probabilities of the neutrons with the fissile materials of the core for each mesh j, $1 \leqq j \leqq J$,

(b) calculation of the real interaction probabilities of the neutrons in the core as a function of physical parameters describing the state of the core,

(c) calculation of second neutron flux components $\phi^1(j,g)$, $1 \leqq j \leqq J$ as a function of the neutron fluxes $\phi^0(j,g)$ of the predetermined interaction probabilities of the neutrons in the core and the real interaction probabilities of the neutrons in the core,

(d) calculation of the neutron fluxes $\phi(j,g)$ in each mesh j, as the sum of the first and second neutron flux components,

(e) calculation of the new sources NS(j), $1 \leqq j \leqq J$ associated with each neutron flux $\phi(j,g)$ and new values of sources S(j) by the relation:

$$S(j) = \frac{NS(j)}{\sum_{j=1}^{J} NS(j)}$$

(f) calculation of the powers P(j) emitted in each mesh j as a function of the total power P emitted and the sources S(j),

(B) the regulating means is controlled as a function of the neutron fluxes $\phi(j,g)$ and powers P(j).

4,876,058

NUCLEAR POWER GENERATING STATION EQUIPMENT QUALIFICATION METHOD AND APPARATUS

Arnold H. Fero, New Kensington; Lawrence M. Potochnik, Washington Township, Westmoreland County; Ronald W. Riling, Penn Hills, and Kenneth F. Semethy, North Versailles Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 5, 1987, Ser. No. 104,733

Int. Cl.[4] G21C *17/00*

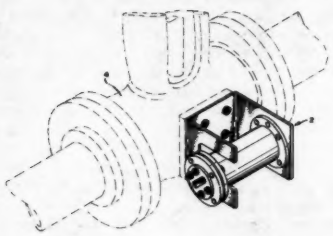
U.S. Cl. 376—247 **26 Claims**

26. In a nuclear power plant having an object piece of qualified equipment exposed to gamma and beta radiation, as well as thermal transients from a service temperature, apparatus for monitoring the object piece to project its ability for extensions of its qualified life, comprising:

passive means for detecting a total integrated dose of radiation received by the object piece, said passive detection means comprising first dosimetry means exposed only to gamma rays for measuring a gamma ray dose, and, a second dosimetry means separate and distinct from said

first dosimetry means, said second dosimetry means for measuring a beta ray dose;

means for determining a thermal history of the object piece comprising first monitor means for determining a peak temperature experienced by the object piece and second monitor means for determining an integrated thermal



exposure to the object piece, said determining means being separate and distinct from said first dosimetry means and said second dosimetry means; and

means for housing said passive detection means and said means for determining said thermal history in close proximity to the object piece.

4,876,059

TEMPERATURE MEASUREMENT

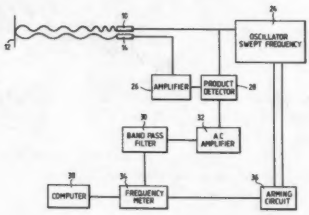
Peter J. Conroy, Warrington, United Kingdom, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Jul. 18, 1988, Ser. No. 219,783

Claims priority, application United Kingdom, Aug. 6, 1987, 8718644

Int. Cl.[4] G21C *17/02*; G01K *11/24*

U.S. Cl. 376—247 **6 Claims**



6. In combination, a nuclear reactor comprising a core having sub-assemblies containing nuclear fuel, and apparatus for measuring temperature at different localized zones within a fluid medium comprising:

(a) transmitter means located remotely from said zones for transmitting signals in the form of continuous wave, high frequency stress wave energy through said fluid medium towards reflector targets associated with said zones, the reflector targets respectively being structural parts at the tops of said sub-assemblies and having known relative positions;

(b) means for controlling the transmitter means to effect progressive change of the transmitted signal frequency;

(c) a reference signal source for producing a reference signal whose frequency is related to that of the transmitted signal and undergoes progressive change at the same rate as the latter;

(d) receiver means for receiving the reflected signals emanating form the reflector targets;

(e) means for multiplicatively combining each received signal with the reference signal to produce for each target a difference frequency output; and

(f) means for analysing said difference frequency outputs to derive values for the temperatures prevailing at locations between adjacent reflector targets.

4,876,060

CONTROL BLADE FOR NUCLEAR REACTOR

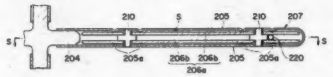
Ritsuo Yoshioka; Makoto Ueda, both of Yokohama; Yoichi Motora, Tokyo, and Mitsuharu Nakamura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 30, 1987, Ser. No. 68,190

Claims priority, application Japan, Jun. 30, 1986, 61-151567; Feb. 12, 1987, 62-28339; Feb. 12, 1987, 62-28340; Mar. 4, 1987, 62-47677; Mar. 10, 1987, 62-54986; Mar. 31, 1987, 62-78171

Int. Cl.[4] G21C *7/10*

U.S. Cl. 376—333 **23 Claims**



1. A control blade for use in nuclear reactors comprising:

an upper structure means;

a lower structure means;

a central tie rod means for connecting integrally said upper and lower structure means together, having radial projections so as to exhibit a substantially cross-shaped cross-section;

a sheath plate means having a substantially U-shaped cross-section and secured to the end of each projection of said central tie rod means; and

neutron absorber means charged in each of said sheath plate means;

said neutron absorber means being divided into a plurality of neutron absorber elements along the axis of said central tie rod means, each neutron absorber element being composed of a pair of neutron absorber plates or sheets spaced from and opposing each other;

a supporting spacer means disposed for supporting said opposing neutron absorber plates; and

a water gap for guiding the flow of a moderator defined between said neutron absorber plates, wherein said supporting spacer means comprises a plurality of supporting spacers disposed between said opposing neutron absorber plates, each of said supporting spacers including a spacing portion engaging with inner surfaces of said opposing neutron absorber plates and supporting portions projecting from centers of both ends of the spacing portions, said opposing neutron absorber plates being provided with holes in such a manner that said supporting portions of said spacers loosely penetrate said holes of said absorber plates and are secured to walls of said sheath plate means.

4,876,061

RESILIENTLY LOADED LATERAL SUPPORTS FOR CANTILEVER-MOUNTED ROD GUIDES OF A PRESSURIZED WATER REACTOR

Douglas E. Ekeroth, Plum Boro, and Luciano Veronesi, O'Hara Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 926,301, Nov. 3, 1986, abandoned. This application Aug. 24, 1988, Ser. No. 236,291

Int. Cl.[4] G21C *5/02*

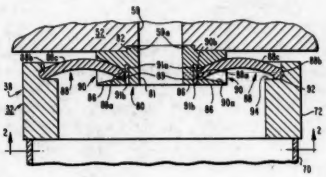
U.S. Cl. 376—353 **25 Claims**

11. A resiliently loaded top end support for each of plural rod guides disposed in closely spaced, parallel axial relationship within the inner barrel assembly of a pressurized water reactor vessel, the inner barrel assembly occupying a central

portion of the vessel and being of a vertical height extending from a first plate of lower elevation to s second plate of higher elevation within the vessel, said second plate being moveable axially into and out of assembled relationship with the inner barrel assembly, each said rod guide having a thin sidewall portion of elongated configuration and being of an axial length corresponding substantially to the vertical height of said inner barrel assembly and being mounted at the lower end thereof to the first plate and accommodating in axial, sliding relationship therewithin plural, respectively associated rod clusters, said resiliently loaded top end support comprising, for each said rod guide:

a mount having an exterior surface and upper and lower ends, and adapted for being secured at the upper end thereof to the lower surface of the second plate and depending axially downwardly therefrom and defining an alignment axis for a corresponding said rod guide within the inner barrel assembly;

an axially extending sleeve having an interior surface and



upper and lower ends, affixed at the lower end thereof to the upper end of the associated thin sidewall of said rod guide and of an axial length sufficient to dispose the upper end of said sleeve closely adjacent to but displaced from the lower surface of the second plate when in the assembled relationship;

means for releasably interconnecting said sleeve and said mount, said releasably interconnecting means, in the assembled relationship, directly producing resilient lateral loading, substantially perpendicular to the alignment axis, between said mount and said sleeve for maintaining said sleeve and associated rod guide aligned with said alignment axis; and

the upper end of the sleeve receiving the lower end of the mount in substantially coaxial, telescoping relationship with the respective exterior and interior surfaces thereof in spaced, juxtaposed relationship and with the releasable interconnecting means extending between the said, respective exterior and interior surfaces thereof for directly producing said resilient lateral loading therebetween.

4,876,062

FUEL ASSEMBLY

Motoo Aoyama, Hitachi; Yasunori Bessho, Mito; Sadao Uchikawa, Katsuta; Renzo Takeda, Kawasaki, and Yoshihiko Ishii, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

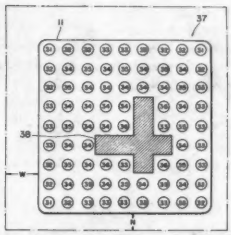
Filed Mar. 24, 1988, Ser. No. 172,418

Claims priority, application Japan, Mar. 25, 1987, 62-68873

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—444 **11 Claims**

1. A fuel assembly comprising a plurality of fuel rods and a moderating rod containing a moderator and disposed at a generally central portion, of said fuel assembly, the ratio A_M/A_C of the area A_M of a moderator region in said moderating rod in the cross-sectional plane in which said moderator is present to the area A_C of the coolant passages in said fuel assembly being within the range of 0.07 to 0.11, and said area A_M being 75% or more of the total area of the fuel lattice units



in which none of said fuel rods is arranged, but said moderating rod is arranged.

4,876,063

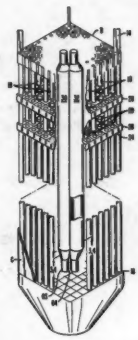
DOUBLE-D WATER ROD FOR 9 BY 9 FUEL BUNDLE

Eric B. Johansson, San Jose, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Mar. 17, 1988, Ser. No. 169,546

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—444 **5 Claims**



1. An improved fuel assembly including a lower tie-plate, an upper tie-plate, a square sectioned channel connecting said lower and upper tie-plate in fluid tight relation whereby fluid entering said lower tie-plate is discharged out said upper tie-plate, fuel rods each containing fissionable material therewithin, said fuel rods being held at said upper and lower tie-plates in a 9 by 9 array of rows and columns with all fuel rods having the same diameter; a plurality of spacers placed between said fuel rods for maintaining said fuel rods in spaced apart relation between said upper and lower tie-plates; said fuel rods in said 9 by 9 array having three said fuel rods removed from the middle row and two said fuel rods removed from each row on either side of said middle row to create a vacated interstitial volume defined by the absence of said removed fuel rods, the removal of said fuel rods at each row on either side displaced towards adjacent corners of said 9 by 9 array;

a pair of water rods for placement in the vacated interstitial volume, said water rods each including vertically extending cylindrical wall portions extending across approximately 270° of arc around a generally cylindrical form of said water rods and a truncating vertically extending cord wall being disposed in a flat planar vertically extending disposition between the two ends of said cylindrical wall

portion of said water rods whereby said cord wall of said water rods imparts a generally "D" cross-section to said water rod, said water rods each being placed in back-to-back relation in said fuel bundle at said vacated spatial interval, said rods confronted at their respective flat cord walls whereby said vacated interstitial volume is filled with said water to provide improved water moderation of said nuclear reaction at said fuel bundle.

4,876,064

CORROSION RESISTANT ZIRCONIUM ALLOYS CONTAINING BISMUTH

Dale F. Taylor, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 41,508, Apr. 23, 1987, abandoned. This application Jun. 28, 1988, Ser. No. 212,460

Int. Cl.[4] C22C *16/00*

U.S. Cl. 420—422 **23 Claims**

1. A corrosion-resistant alloy consisting essentially of 0.5 to 2.5 weight percent of bismuth, 0.5–1.0 weight percent of a solute composed of a member selected from the group consisting of molybdenum, tellurium, niobium and mixtures thereof; and the balance zirconium.

4,876,065

CORROSION-RESISTING FE-NI-CR ALLOY

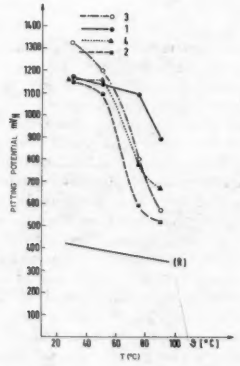
Manfred Rockel, Friedrichsdorf; Ernst Wallis, Eschborn; Michael Köhler, Iserlohn; Ulrich Heubner, Werdohl, and Rolf Kirchheiner, Iserlohn, all of Fed. Rep. of Germany, assignors to VDM Nickel-Technologie Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 19, 1988, Ser. No. 196,034

Claims priority, application Fed. Rep. of Germany, May 19, 1987, 3716665

Int. Cl.[4] C22C *30/00*

U.S. Cl. 420—582 **16 Claims**



1. An alloy consisting essentially of: 30 to 32% nickel; 26 to 28% chromium; 0.5 to 1.5% copper; 6 to 7% molybdenum; up to 2% manganese; up to 1.0% silicon, up to 0.2% aluminum, up to 0.03% carbon; 0.10 to 0.25% nitrogen; balance iron .

4,876,066

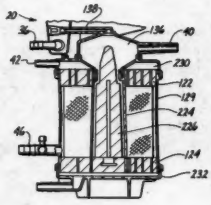
INTEGRATED MEMBRANE OXYGENATOR, HEAT EXCHANGER AND RESERVOIR

Richard L. Bringham, San Clemente; Lucas S. Gordon, Laguna Beach, and Karl E. Mosch, Irvine, all of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Division of Ser. No. 885,207, Jul. 14, 1986, Pat. No. 4,698,207. This application Jul. 14, 1987, Ser. No. 73,261

Int. Cl.[4] A61M *1/16*

U.S. Cl. 422—46 **3 Claims**



1. A blood oxygenator comprising:

a vertically disposed, elongated housing defining an internal chamber;

gas-permeable and liquid-impermeable membrane means mounted in said housing internal chamber, said membrane means being arranged to define separate blood and gas flow paths through said housing;

blood inlet and outlet means associated with said housing and formed to communicate with and direct blood through the blood flow path;

gas inlet means and gas outlet means associated with the housing and formed to communicate with and direct gas through the gas flow path;

means situated in an upper portion of said internal chamber which defines a substantially cylindrical compartment in said upper portion between said blood inlet means and said blood flow path, said compartment having a substantial horizontal component and being vertically oriented in said upper portion and communicating with a plurality of openings in said membrane to said blood flow path;

said blood inlet means defining a blood passageway which communicates with said compartment and is arranged with respect to said compartment to direct incoming blood tangentially into said compartment;

said compartment being dimensioned to promote a swirling non-vortex flow in said blood entering said compartment; and

a vent associated with said compartment which is position to allow for the discharge of gas from said compartment.

4,876,067

MULTILAYER TEST STRIP DEVICE WITH A DISSOLVABLE REAGENT LAYER

Ulfert Deneke, Rimbach-Zotzenbach; Rolf Nagel, Bürstadt; Anselm Rothe, Birkenau, and Helmut Freitag, Weinheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Aug. 25, 1987, Ser. No. 89,352

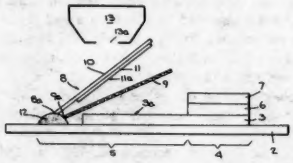
Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3630999

Int. Cl.[4] G01N *21/77*

U.S. Cl. 422—56 **19 Claims**

1. A device for analytical determination of a component in a liquid sample, comprising a first carrier layer having applied thereto a liquid absorbing layer, and a separate second movable carrier having applied thereto a dissolvable reagent-containing layer which is not in initial contact with said first carrier layer, said first carrier layer attached at a point to said second layer as a flap, wherein at least one of said first carrier layer and said

second carrier layer is transparent, said liquid absorbing layer not in initial contact with said second carrier layer and said liquid absorbing layer comprising material which absorbs said reagent-containing layer when said reagent-containing layer is



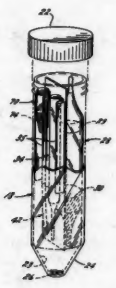
dissolved by contact with a liquid contained in said liquid absorbing layer, said first carrier layer being positioned in said device to permit contact between said liquid absorbing layer and said reagent-containing layer by applying pressure to one of said carrier layers.

4,876,068

TEST KIT FOR COLORIMETRIC ANALYSIS

Henry B. Castaneda, Woodbridge, Va., assignor to Chemetrics, Inc., Calverton, Va.

Filed Mar. 3, 1989, Ser. No. 318,903
Int. Cl.[4] G01N *31/02, 31/22*
U.S. Cl. 422—58 5 Claims



1. A portable test kit useful in the field for colorimetric analysis of trace levels of a dithizonate complexing metal cation in a aqueous sample, said kit comprising

at least one storage tube and lid member assembly, said at least one assembly comprising a storage tube having a conically-shaped end, and being of sufficient volumetric size to serve as a vessel for formation and extraction of an extractable, metal cation-dithizonate complex, and said at least one storage tube and lid member assembly containing

a unit dose amount of dithizone in solid form

a closed container containing in biphasic liquid form, an organic extractant for said metal cation-dithizonate complex, and an aqueous phase containing accessory test reagents for providing appropriate selectivity, said extractant being of greater density than water and being provided in a volume that provides an at least about 10:1 volume ratio of said aqueous sample to said organic extractant;

a sealed, evacuated container means for capturing a portion of a layer formed by colored, dithizonate complex-containing, organic extractant, upon accessing the vacuum in said evacuated container means;

a hollow tubular body having an end constructed so as to form an air-tight sealing relationship with said evacuated container means and, when said evacuated container means and said hollow tubular body are in said air-tight sealing relationship, said combination thereof being open to the ambient atmosphere only at another end of said hollow tubular body; and

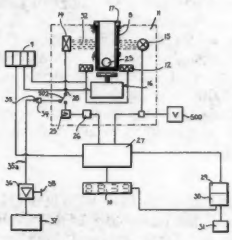
means for providing analysis of the color of said captured layer portion.

4,876,069

BLOOD CLOTTING TIME MEASURING APPARATUS

Siegfried Jochimsen, Falckstrasse 19, DE-2300, Kiel, Fed. Rep. of Germany

Continuation of Ser. No. 483,950, Mar. 8, 1983, abandoned. This application Oct. 27, 1986, Ser. No. 924,155
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1981, 3127560; Nov. 19, 1981, 3145692
Int. Cl.[4] G01N *21/59, 33/86*
U.S. Cl. 422—73 12 Claims



1. Apparatus for measuring blood clotting time; said apparatus being suitable for use with a measuring cell having a bottom, the measuring cell containing a blood sample, the clotting time of which is to be measured; said apparatus comprising:

temperature controlled support means having means defining at least one measuring channel, said measuring channel being capable of receiving the measuring cell containing the blood sample;

magnetic stirring means mounted in said support means proximate to said means defining said measuring channel, said magnetic stirring means including a metal ball positionable at the bottom of the measuring cell when the cell is inserted in said channel, said magnetic stirring means further including a magnetic drive means proximate said means defining said measuring channel, said magnetic drive means being operable to rotate said ball in a circular path about the bottom of the measuring cell;

photo optical turbidity detection means having a light source and a light detector forming a photo optical path containing the measuring cell when the cell is inserted in the channel, said light source being of a type such that, in lower portions of its operating voltage range, a given change in operating voltage results in a greater change in light output than in upper portions of its operating range, said light detector being connected through transmission signal adjustment means to a measured value means having two threshold value limiting means;

voltage supply means for supplying an operating voltage to said light source which is at least half the rated voltage of said source;

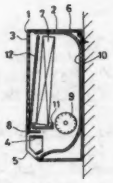
computer means coupled to said measured value means; and

display means coupled to said measured value means for displaying visually perceptible information.

4,876,070
AIR BLOWER APPARATUS

Hitoshi Tsukahara; Keiko Kurokawa; Toshimitsu Tsukui, and Toshitake Nagai, all of Gunma, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Nov. 6, 1987, Ser. No. 118,272
Claims priority, application Japan, Nov. 6, 1986, 61-264300
Int. Cl.[4] A62B *11/00*
U.S. Cl. 422—122 17 Claims



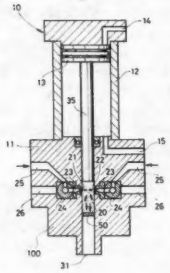
1. In an air blower apparatus for conditioning a room, said apparatus including a fan, a fan casing, a suction grill, a discharge grill and an air filter, at least one of which is a synthetic resin component which comes in contact with an air flow, the improvement comprising:

at least one synthetic resin component molded from polypropylene resin, to which at least one antimicrobial agent selected from the group consisting of diphenylethers, N-haloalkylthio compounds, benzimidazoles, organic arsine compounds and metal alumino-silicate hydrate is mixed prior to molding of said components.

4,876,071
MIXING APPARATUS FOR SYNTHETIC RESIN WITH MULTIPLE RESIN COMPONENTS

Kenichi Toda, and Tetsuhiro Hori, both of Okazaki, Japan, assignors to Kabushiki Kaisha Polyurethane Engineering, Tokyo, Japan

Filed Sep. 18, 1987, Ser. No. 97,786
Claims priority, application Japan, Jun. 25, 1987, 62-158494
Int. Cl.[4] B01F *5/04, 15/02*
U.S. Cl. 422—133 6 Claims



1. A mixing apparatus for resin components comprising:

a body having a through bore and a plurality of inlet ports for introducing resin components into a mixing chamber portion of said bore,

a cleaning member mounted for reciprocal movement in said bore to displace said resin components from said mixing chamber to an outlet port of said bore;

a pair of diametrically opposed passages extending through said body and intersecting said through bore between said inlet ports and said outlet port of said through bore,

a flow varying member slidably mounted in one of said passages for movement between a retracted position and a forward position, said flow varying member having an end portion which is aligned with said bore in said retracted position and located internally of the other said passage in the forward position,

a chamber block slidably mounted in the other said passage for movement between a forward position and a retracted position, said chamber block having a end portion which defines a part of said through bore in said forward position and partially defines a flow varying chamber in said retracted position, and

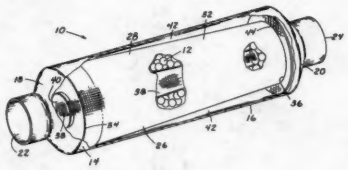
a key member fixed in the other said passage and dividing the other said passage into at least one smaller restriction passage,

whereby said flow varying member in said forward position closes said through bore to movement of said resin components and said end portion of said flow varying member cooperates with said end portion of said chamber block to provide a laterally displaced flow varying chamber accessible in the other said passage through said restriction passage for movement of said resin components from said mixing chamber to said outlet of said bore.

4,876,072
CATALYTIC CONVERTER WITH SCREEN ENCLOSURE HOLDING PELLETS UNDER TENSION

Edward T. Checki, 4747 Highway H, Franksville, Wis. 53126

Filed May 16, 1988, Ser. No. 194,334
Int. Cl.[4] F01N *3/10*
U.S. Cl. 422—179 15 Claims



1. In a catalytic converter of the type with a body of pellets in a housing, the improvement comprising an enclosure within the housing made of resilient screen, the screen enclosure compressing the body of pellets such that the pellets are held firmly in place under tension.

4,876,073
RADIONUCLIDE GENERATOR

David Issachar; Jacob Trumper, both of Rehovot, and Shmuel Abrashkin, Tel Aviv, all of Israel, assignors to State of Israel, Prime Minister's Office Israel Atomic Energy Commission, Soreq Nuclear Research Center, Yavne, Israel

Continuation of Ser. No. 752,912, Jul. 8, 1985, abandoned. This application Dec. 18, 1987, Ser. No. 139,078
Claims priority, application Israel, Jul. 6, 1984, 72321
Int. Cl.[4] G21G *4/08;* C01G *55/00*
U.S. Cl. 423—2 9 Claims

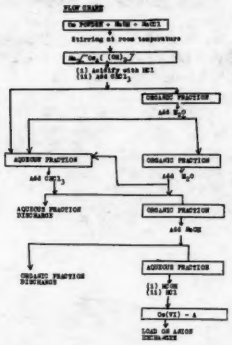
1. A generator of short-lived radionuclides, comprising a column containing a silica gel support impregnated with a long chain quaternary ammonium ion exchange agent having the formula $(R_3N^+CH_3)Cl^-$ wherein the R group is C_8–C_{12} alkyl or at least one of the R groups is phenyl and the remaining groups are C_8–C_{10} alkyl, a complex of a parent radionuclide ^{191}Os being sorbed on said support in an amount sufficient to maintain the parent radionuclide in steady state equilibrium with its short-lived daughter radionuclide ^{191m}Ir, said complex having been produced by:

dissolving radioactive osmium metal in a hypochlorite/hydroxide solution;

acidifying the mixture;

extracting OsO_4 with an organic solvent;

washing the organic phase;
adding an aqueous base to complex and extract the osmium from the organic phase;
adding a reducing agent and acidifying the mixture to form



an osmium complex selected from the group consisting of $Na_2(OsO_2Cl_4)$ and $Na_2(OsO_2(OH)_2Cl_2)$;
the daughter radionuclides being selectively eluted from the column by elution with physiological saline having a pH of about 1.

4,876,074
METHOD FOR SEPARATING ZINC OUT OF A HOT GAS CONTAINING ZINC VAPOUR

Bengt O. Gustafsson, Falun, and Nils B. Johansson, Hofors, both of Sweden, assignors to SKF Plasma Technologies AB, Hofors, Sweden

Filed Sep. 16, 1988, Ser. No. 245,424
Claims priority, application Sweden, Oct. 12, 1987, 8703930; Mar. 23, 1988, 8801058
Int. Cl.[4] B01D *47/00, 19/00*
U.S. Cl. 423—210.5 **9 Claims**

1. A method for separating zinc from a hot gas containing zinc vapour, the gas being conducted through a gas cooler where the zinc vapour is condensed on a flow of liquid lead which is recirculated and cooled for separation of the zinc, wherein heat from a lead flow coming from said gas cooler is transmitted to a chamber from which lead is introduced into said gas cooler; wherein the lead flow from the gas cooler is cooled to a temperature at which the concentration of zinc exceeds the solubility of zinc in the lead so that zinc is precipitated and the precipitated zinc is separated by density; and wherein the cooled lead flow, low in zinc, is transferred to said chamber to be heated by heated lead transmitted thereto, and the lead flow heated in the way is introduced into said gas cooler, thus acquiring a zinc saturation solubility in excess of its zinc content.

4,876,075
REMOVAL OF H_2S FROM GAS STREAMS

David A. Van Kleeck, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 17, 1988, Ser. No. 258,425
Int. Cl.[4] C01B *17/16, 31/20*
U.S. Cl. 423—226 **11 Claims**

1. A process for the removal of H_2S from a sour gaseous stream comprising

(a) intimately cocurrently contacting the sour gaseous stream in said first contacting zone with an upwardly flowing aqueous reactant solution containing solubilized ferric chelate and solubilized ferrous chelate, at a temperature below the melting point of sulfur, at sufficient solution to gas ratio and conditions effective to convert H_2S to sulfur and inhibit sulfur deposition, and producing an upwardly flowing continuous liquid phase mixture comprising sour gas dispersed in an aqueous reactant solution as the continuous phase;

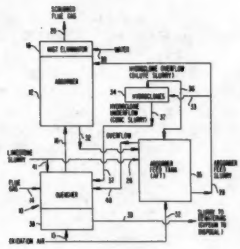
(b) passing the continuous liquid phase mixture from step (a) through a plurality of enclosed contacting sections in serial flow communication in a second zone, under conditions to convert H_2S to sulfur and at a temperature below the melting point of sulfur, the first contacting section of said second contacting zone comprising a plurality of discrete sulfur deposition resistant channels, each discrete channel providing a diverted flow path for the continuous liquid phase mixture through the section, such that continuous liquid phase mixture is directed at least initially at an angle acute to that of the direction of flow of the continuous liquid phase mixture entering the section; the second contacting section through which the continuous liquid phase mixture is passed comprising a plurality of discrete sulfur deposition resistant channels, each discrete channel providing a diverted flow path for the continuous liquid phase mixture through the section, such that the continuous liquid phase mixture is directed at least initially at an angle acute to that of the direction of flow of the continuous liquid phase mixture entering the section; and producing a gas in reactant continuous liquid phase mixture containing solid sulfur in said second contacting zone;

(c) separating the gas having reduced H_2S content from the gas in reactant solution mixture reduced in content of solubilized ferric chelate produced in step (b).

4,876,076
PROCESS OF DESULFURIZATION

James D. Colley, Austin, Tex., assignor to Tampa Electric Company, Tampa, Fla.

Filed Feb. 10, 1988, Ser. No. 154,946
Int. Cl.[4] C01B *17/00*
U.S. Cl. 423—242 **2 Claims**



1. In a process for the desulfurization of flue gas utilizing limestone as absorbent in a double loop system, wherein the flue gas is introduced into a quenching zone for contact with a first slurry of said limestone, and thereafter passes to an absorbing zone for further contact with a second slurry of said limestone, the said second slurry being supplied from a mixing zone into which water and limestone are charged, said first slurry being supplied from the solids rich stream from a solid-liquid separator which is supplied from said mixing zone, and wherein air is introduced into said quenching zone to convert the calcium sulfite present therein to gypsum, the improvement which comprises supplying air to said mixing zone to convert calcium sulfite therein to larger gypsum crystals which are preferentially separated into said first slurry.

4,876,077

PROCESS FOR PRODUCING GRAPHITE

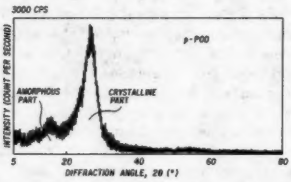
Mutsuaki Murakami, Tokyo, Japan, assignor to Research Development Corp. of Japan, Tokyo and Matsushita Elec. Industries Co. Ltd., Osaka, both of, Japan, a part interest

Continuation-in-part of Ser. No. 866,297, May 23, 1986, abandoned. This application Dec. 15, 1987, Ser. No. 133,371

Claims priority, application Japan, May 30, 1985, 60-115415; May 30, 1985, 60-115416

Int. Cl.[4] G01B *31/04*

U.S. Cl. 423—448 14 Claims



1. A process for producing graphite, which comprises heat treating a film-shaped polymer selected from the group consisting of poly (m-phenylene-1,3,4-oxadiazole), poly (p-phenylene-1,3,4-oxadiazole), polybenzothiazoles, a polybenzobisthiazole, a polybenzoxazole, a polybenzobisoxazole and a polythiazole in an inert gas atmosphere or in vacuo, at a temperature of at least 2500 ° C., for at least 30 minutes, and thereby converting the polymer to highly-graphitized graphite.

4,876,078

PROCESS FOR PREPARING CARBON FIBERS IN GAS PHASE GROWTH

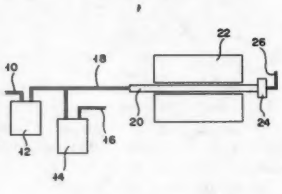
Kohei Arakawa, and Takashi Ohsaki, both of Shibuya, Japan, assignors to Nikkiso Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 719,340, Apr. 3, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 70,648

Claims priority, application Japan, Apr. 20, 1984, 59-78662

Int. Cl.[4] D01F *9/12*

U.S. Cl. 423—447.3 2 Claims



1. In a process for preparing carbon fibers in a gaseous phase reaction, the improvement comprising introducing a gas mixture comprising at least one carbon compound, at least one inorganic transition metal compound gas and at least one carrier gas into a reactor and subjecting said mixture to a temperature of 600° C. to 1300° C. in said reactor for inducing growth of carbon fibers without using any substrate.

4,876,079

SEPARATION OF A MIXTURE OF SULFUR AND ALKALINE SOLUTION AND APPARATUS THEREFOR

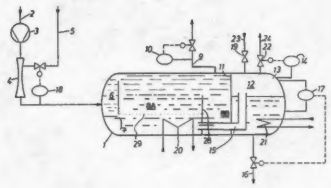
Erhard Kliem, Eurasburg; Guenter Weber, Linden, and Alfred Kunz, Grossdingharting, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Continuation of Ser. No. 881,766, Jul. 3, 1986, abandoned. This application May 31, 1988, Ser. No. 201,382

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1985, 3523846

Int. Cl.[4] B01D *17/00;* C01B *17/027*

U.S. Cl. 423—578 R 13 Claims



1. In a process for the separation of sulfur from a sulfur/alkaline solution suspension, wherein the suspension is heated to a temperature above the sulfur melting temperature and is conducted under pressure to a separating tank having a separator chamber, alkaline solution chamber and sulfur chamber, from which tank there is continuously withdrawn both a settled liquid sulfur stream and also an alkaline solution stream, the improvement comprising operating the separating chamber and the alkaline solution chamber in a flooded mode at a pressure above the saturation pressure and maintaining in the sulfur chamber a gas blanket having a pressure in the sulfur chamber of about the same pressure as in the separating and alkaline solution chambers, said gas blanket being an inert gas or steam.

4,876,080

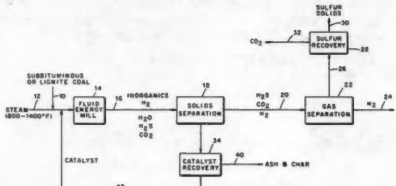
HYDROGEN PRODUCTION WITH COAL USING A PULVERIZATION DEVICE

Leland E. Paulson, Morgantown, W. Va., assignor to The United States of Americal as represented by the United States Department of Energy, Washington, D.C.

Continuation of Ser. No. 941,130, Dec. 12, 1986, abandoned. This application Mar. 29, 1988, Ser. No. 175,659

Int. Cl.[4] C01B *1/02*

U.S. Cl. 423—648.1 7 Claims



1. A method for producing hydrogen from coal by the steps consisting essentially of contacting coal particulates having a particulate size in the range of about 0.75 to 0.25 inch with steam at a temperature in the range of about 800° to 1400° F. for subjecting the coal particulates to turbulent particle-to-particle contact while imparting sufficient velocity to the coal particulates to effect comminution thereof into smaller fractions of a maximum size of about 15 micrometers for signifi-

cantly increasing the surface area of the coal by said particle-to-particle contact, and contacting the coal particles during the comminution thereof with the steam at a temperature in said range of about 800° to about 1400° F. to effect an endothermic steam-carbon reaction for generating gaseous hydrogen.

4,876,081

VINYL SUBSTITUTED RADIOHALOGEN AND METHODS OF USE CONJUGATES

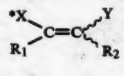
Daniel S. Wilbur, Edmonds, and Hadley, Stephen W., Seattle, both of Wash., assignors to NeoRx Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 39,155, Apr. 16, 1987. This application Apr. 5, 1988, Ser. No. 171,731

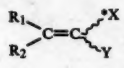
Int. Cl.[4] A61K *49/02, 37/02, 39/44*

U.S. Cl. 424—1.1 **12 Claims**

1. A radiohalogenated protein, protein fragment or polypeptide comprising a protein, protein fragment or polypeptide attached to a compound according to formula (I) or (II):



I



II

wherein

*X is a radiohalogen,

C═C is a double bonded set of sp^2 hybridized carbon atoms,

R_1 and R_2 are substituents independently selected from among: hydrogen,

alkyl or substituted alkyl, provided that any sp^2 or sp carbon substituted on the alkyl is separated from C═C by at least one fully substituted sp^3 carbon atom,

aryl or substituted aryl, provided that the aryl or substituted aryl is bonded directly to C═C,

heteroalkyl, provided, first, that no heteroatom of the heteroalkyl bonds directly to C═C, and, second, that any sp^2 or sp carbon atom bonded to a heteroatom of the heteroalkyl is not bonded directly to or otherwise conjugated with C═C, and, third, that where a single sp^3 carbon atom intervenes between C═C and an sp^2 or sp carbon atom bonded to a heteroatom, that intervening sp^3 carbon must be fully substituted,

heteroaryl, provided that a heteroatom of the heteroaryl is not bonded directly to or conjugated with C═C,

mixed alkylaryl, provided, first, that no heteroatom is bonded to C═C, and, second, that either an aryl moiety of the mixed alkylaryl is directly bonded to C═C or that any aryl moiety is separated from C═C by at least one sp^3 carbon, and, third, that where only one sp^3 carbon atom intervenes between C═C and an aryl moiety, that intervening sp^3 carbon must be fully substituted, and

Y is a substituent, comprising any of the groups described above for R_1 and R_2 except hydrogen, and bearing a function group suitable for reacting with the protein, protein fragment, or polypeptide under conditions that preserve biological activity of the protein, protein fragment, or polypeptide.

4,876,082

TOOTH-PASTE WITH BRUSHING TIME INDICATOR

Roch Romeo, 9, Rue Treilhard, 75008 Paris, France

Filed Jul. 1, 1988, Ser. No. 214,222

Claims priority, application France, Jul. 6, 1987, 87 09551

Int. Cl.[4] A61K *7/16*

U.S. Cl. 424—7.1 **3 Claims**

1. A tooth-paste comprising a coloring agent to produce a colored toothpaste and a reducing agent for decoloring said tooth-paste under the effect of brushing, wherein said tooth-paste is fluorine-based and contains methylene blue in a proportion of 500 μl to 1 ml, in a 1 mg/ml solution, for 5 grams of tooth-paste and a reducing agent comprising sodium ascorbate in powder form for mixing with the coloring agent at the moment of use.

4,876,083

COMPOSITION IN THE FORM OF AN AEROSOL FOAM, BASED ON A POLYMER DERIVED FROM QUATERNIZED CELLULOSE AND AN ANIONIC POLYMER

Jean F. Grollier, and Christine Dupuis, both of Paris, France, assignors to L'oreal, Paris, France

Filed Sep. 14, 1987, Ser. No. 95,861

Claims priority, application Luxembourg, Sep. 15, 1986, 86.585

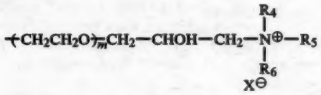
Int. Cl.[4] A61K *7/48, 7/15, 7/42, 7/021*

U.S. Cl. 424—47 **13 Claims**

1. Cosmetic composition for use on skin packaged under pressure in an aerosol device, in the presence of a propellant, containing in a cosmetically acceptable medium between 0.3 and 5% by weight relative to the total weight of the composition of a quaternary cellulose ether corresponding to the formula:

(I)

$R_{cellulose}$ is a radical of an anhydroglucose unit in which at least one of the groups R_1, R_2 or R_3 denotes a radical of formula



in which m is an integer with a value from 2 to 10, R_4, R_5 and R_6 denote a lower alkyl radical containing 1 to 4 carbon atoms, $X^{\ominus}$ denotes a cosmetically acceptable anion, the remaining groups R_1, R_2 or R_3 denoting a lower hydroxyalkyl radical containing 1 t 4 carbon atoms, and

a graft copolymer of vinyl acetate, crotonic acid and polyalkylene glycol, under conditions such that they form, from the device, a stable foam on expansion in air which has a life-span longer than 1 minute after application to the skin.

4,876,084

P-HYDROXYCINNAMAMIDE DERIVATIVES AND MELANIN INHIBITOR COMPRISING THE SAME

Kimihiko Hori, Utsunomiya; Koichi Nakamura, Wakayama; Michio Kawai, Funabashi; Itsuro Motegi, Utsunomiya; Genji Imokawa, Utsunomiya, and Naotake Takaishi, Utsunomiya, all of Japan, assignors to Kao Corporation, Tokyo, Japan

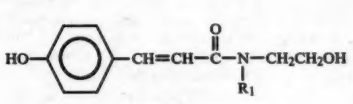
Filed Jul. 23, 1987, Ser. No. 76,872

Claims priority, application Japan, Aug. 4, 1986, 61-183068; Apr. 9, 1987, 62-87815

Int. Cl.[4] D61K *7/78;* **C07C** *103/76, 103/78*

U.S. Cl. 424—62 **2 Claims**

2. A melanin inhibitor composition, comprising: an active component of a p-hydroxycinnamamide derivative of the formula:



wherein R_1 is hydrogen or a 2-hydroxyethyl group in a cosmetically acceptable vehicle.

4,876,085

COSMETIC COMPOSITION CONTAINING OXATHIAZINONES

Jean F. Grollier, and Chantal Fourcadier, both of Paris, France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 608,910, May 10, 1984, abandoned. This application May 19, 1986, Ser. No. 864,573

Claims priority, application Luxembourg, May 11, 1983, 84800

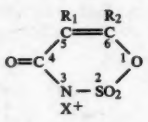
Int. Cl.[4] A61K *7/06, 7/07, 7/42, 9/12*

U.S. Cl. 424—47 46 Claims

1. A cosmetic composition suitable for treating greasy hair or skin, which comprises,

in a cosmetically acceptable vehicle,

from about 0.05% to 20% by weight of at least one oxathiazinone derivative of the formula:



in which

R_1 denotes hydrogen or an alkyl radical having from 1 to 4 carbon atoms;

R_2 denotes an alkyl radical having from 1 to 4 carbon atoms; and

X denotes an alkali metal; and

at least one cosmetic adjuvant selected from the group consisting of non-ionic, anionic, cationic, and amphoteric surface active agents and mixtures thereof, thickeners, cosmetic polymers, preservatives, sequestering agents, foam snynergistic agents, foam stabilizers, sun filters, colourants, pigments, fatty alcohols, waxes, humectants and perfumes.

4,876,086

INJECTABLE COMPOSITIONS OF AMOXYCILLIN TRIHYDRATE

John S. Dowrick, Littlehampton, England, assignor to Beecham Group p.l.c., England

Continuation of Ser. No. 822,842, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 679,916, Dec. 10, 1984, abandoned, which is a continuation of Ser. No. 432,924, Oct. 5, 1982, abandoned, which is a continuation of Ser. No. 156,363, Jun. 4, 1980, abandoned, which is a continuation of Ser. No. 949,241, Oct. 6, 1978, abandoned, which is a continuation of Ser. No. 748,696, Dec. 8, 1976, abandoned, and a continuation-in-part of Ser. No. 661,370, Feb. 25, 1976, abandoned, and a continuation-in-part of Ser. No. 661,372, Feb. 25, 1976, abandoned. This application Sep. 17, 1987, Ser. No. 98,326

Claims priority, application United Kingdom, Mar. 7, 1975, 09515

Int. Cl.[4] H61K *31/79, 31/43*

U.S. Cl. 424—80 7 Claims

1. An antibacterial pharmaceutical composition providing prolonged effective antibiotic blood level, said composition comprising amoxycillin trihyrate in the form of fine particles of an average diameter of from 2μ to 20μ at least 95% of which have diameters of between 0.5μ and 50μ and which fine particles are coated with a dispersing agent consisting of polyvinylpyrrolidone and lecithin, the ratio of amoxycillin trihydrate to said dispersing agent being about 50:1, the ratio of polyvinylpyrrolidone to lecithin being about 5:1, said composition being in the form of a powder which may be constituted to a sterile, injectable suspension of amoxycillin trihydrate formed upon the addition of a pharmaceutically acceptable aqueous vehicle to a said composition and which suspension has enhanced stability and a pH in the range of 5.5.

4,876,087

USE OF N,N-DIETHYL-M-TOLUAMIDE AND/OR THE ETHYL ESTER OF 2-METHYL-3-PENTENOIC ACID AS MOSQUITO ATTRACTANTS

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft, N.J.; Braja D. Mookherjee, Holmdel, N.J.; Ira Katz, West Long Branch, N.J., and Kenneth R. Schrankel, Tinton Falls, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Continuation of Ser. No. 26,978, Mar. 17, 1987, abandoned. This application Jun. 30, 1988, Ser. No. 213,681

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.[4] A01N *25/00, 37/02, 37/18*

U.S. Cl. 424—84 3 Claims

1. A method of attracting Culicidae to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant-containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of said polymer of a composition of matter selected from the group consisting of:

(i) N,N-diethyl-m-toluamide; and

(ii) an effective Culicidae attracting mixture of N,N-diethyl-m-toluamide and the ethyl ester of 2-methyl-3-pentenoic acid

said polymer being compatible with said composition of matter.

4,876,088

GAMMA-GLOBULIN INJECTABLE SOLUTIONS CONTAINING SORBITOL

Yutaka Hirao; Kazuo Takechi, both of Osaka; Katuhiro Uriyu, Nara, and Yahiro Uemura, Osaka, all of Japan, assignors to Green Cross Corporation, Osaka, Japan

Filed Feb. 5, 1988, Ser. No. 152,217

Claims priority, application Japan, Feb. 6, 1987, 62-27031

Int. Cl.[4] A61K *39/395;* C08L *89/00*

U.S. Cl. 424—85.8 5 Claims

1. An intravenously injectable solution of chemically unmodified gamma-globulin having a complete molecular structure, said solution containing sorbitol in a concentration of from 1 to 20% by weight per volume as a stabilizer and having a low electrical conductivity and a pH of about 5.5±0.2, said solution having an electrical conductivity of not higher than 1 mmho as measured at 8° C.

4,876,089

FELINE LEUKEMIA VIRUS PROTEIN VACCINES

Paul Luciw, Emeryville; Deborah L. Parkes, Oakland, and Gary A. Van Nest, El Sobrante, all of Calif., assignors to Chiron Corporation, Emeryville, Calif.

Continuation of Ser. No. 647,966, Sep. 6, 1984, abandoned. This application Aug. 14, 1987, Ser. No. 87,954

Int. Cl.[4] A61K *37/02*

U.S. Cl. 424—89 13 Claims

1. A polypeptide capable of inducing an immune response to produce antibodies specific for feline leukemia virus (FeLV) envelope glycoprotein, said polypeptide having been produced in a unicellular microorganism host and having the glycosylation pattern imposed by said unicellular host.

4,876,090

SYSTEMIC INSECT REPELLENT COMPOSITION AND METHOD

Richard Weisler, 8690 N.W. 56th St., Coral Springs, Fla. 33065

Filed Sep. 21, 1987, Ser. No. 98,686
Int. Cl.[4] A61K *35/78, 31/51*
U.S. Cl. 424—195.1 11 Claims

1. A nutritional dietary supplement which, when ingested at regular intervals of about every 12 hours, affords essentially continuous protection of mammals from infestation by fleas and ticks, said supplement consisting essentially of an insect repellant effective amount of a mixture of aneurine and allium sativum, the relative proportion of aneurine to allium sativum in such mixture being at least about 1:20.

4,876,091

GYPSUM-BASED INSECTICIDE PELLETS AND METHOD OF MANUFACTURE

John L. Clarke, Jr., 402 Fairbank Rd., Riverside, Ill. 60546

Continuation-in-part of Ser. No. 125,150, Nov. 25, 1987, which is a continuation-in-part of Ser. No. 904,905, Sep. 8, 1986, abandoned. This application Nov. 18, 1988, Ser. No. 273,206
Int. Cl.[4] A01N *25/00, 63/00;* A01M *1/20*
U.S. Cl. 424—421 10 Claims

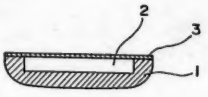
1. A machine distributable gypsum-based pesticide product which is non-porous and substantially without internal or external voids and in which the gypsum is a solid formed by the bonding of plaster of paris and water which includes, prior to formation of the solid, by weight, no more than the minimum water required for substantial hydration of the plaster of paris, approximately 5 percent of a pesticide, with the balance plaster of paris, the pesticide, water and plaster of paris being generally uniformly mixed to provide for generally uniform release of the pesticide over the life of the product, the product, after setting, having essentially no free water in that substantially all water is absorbed in the chemical reaction between the plaster of Paris and water, the product having a maximum surface area of on the order of about 180 mm^2, and a maximum weight of on the order of about 0.3 gram.

4,876,092

SHEET-SHAPED ADHESIVE PREPARATION APPLICABLE TO ORAL CAVITY

Tadafumi Mizobuchi; Akihito Ohji, both of Kagawa; Seiichi Sakoh, Anan, and Yasuyoshi Muguruma, Kagawa, all of Japan, assignors to Teikoku Seiyaku Kabushiki Kaisha, Kagawa, Japan

Filed Jan. 30, 1987, Ser. No. 8,771
Claims priority, application Japan, Feb. 1, 1986, 61-020468
Int. Cl.[4] A61K *13/00;* B32B *23/04*
U.S. Cl. 424—435 16 Claims



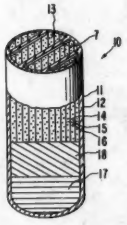
1. A sheet-shaped adhesive pharmaceutical preparation capable of adhering within the oral cavity which comprises an adhesive layer containing as essential components a carboxyvinyl polymer, a water-soluble methacrylic copolymer, a polyhydric alcohol and a pharmaceutically active agent, and a water-impermeable and water-insoluble carrier layer containing as essential components a pharmaceutically acceptable water-insoluble, film-forming high molecular weight compound and a plasticizer, wherein the ingredients of the adhesive layer are substantially released from one side of the sheet-shaped preparation whereby the ingredients are absorbed through the mucous membrane, or teethridge to which it is adhered.

4,876,093

DISPENSER WITH DISPERSING MEMBER FOR DELIVERING BENEFICIAL AGENT

Felix Theeuwes, Los Altos, and Patrick S. L. Wong, Hayward, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Jul. 2, 1987, Ser. No. 69,148
The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.
Int. Cl.[4] A61K *9/22;* A61M *31/00*
U.S. Cl. 424—438 21 Claims



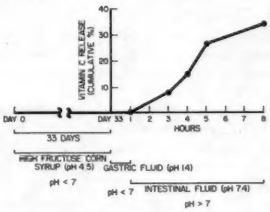
1. A dispenser for administering a beneficial agent formulation to an animal environment of use, the dispenser comprising:
(a) a wall that surrounds and defines an internal lumen, the wall comprising at least in part a semipermeable composition that is permeable to the passage of fluid and is substantially impermeable to the passage of a beneficial agent;
(b) carrier means in the lumen for administering a beneficial agent to the animal environment of use, said carrier means substantially maintaining its physical and chemical integrity while in the lumen of the dispenser;
(c) a beneficial agent in the carrier means for administering a beneficial agent;
(d) pushing means for occupying an increasing amount of space in the lumen for pushing the carrier means comprising the beneficial agent from the dispenser; and,
(e) a mouth in the dispenser comprising means for breaking the carrier means from a first size to a second size as the carrier means leaves the dispenser.

4,876,094

CONTROLLED RELEASE LIQUID DOSAGE FORMULATION

Ben F. Benton, Centerburg, and David L. Gardner, Bellville, both of Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Continuation-in-part of Ser. No. 570,469, Jan. 13, 1984, abandoned. This application Jul. 14, 1986, Ser. No. 884,167
Int. Cl.[4] A61K *47/00*
U.S. Cl. 424—491 4 Claims



1. A drinkable liquid suspension of solid dosage forms con-

sisting of dual coated theophylline cores in an acidic carrier liquid comprising:

cores of not more than 1400 microns in diameter consisting of a solid binding material and a therapeutically active substance,

dual coatings consisting of a first coating and a second coating over said cores for retarding release of the therapeutically active substance to the acidic carrier liquid and for permitting release in an alkaline environment,

the first coating comprising an ingestible fat having a melting point of 101° F. or less, the first coating comprising 4.8 to 17.7% by weight of the total weight of the dosage forms,

the second coating comprising zein, the second coating comprising 2.3 to 10% by weight of the total weight of the dosage forms,

a carrier liquid for suspending the dosage forms, the carrier liquid having a pH<5 and comprising a viscous aqueous solution of a sugar.

4,876,095

CHEWING GUM COMPOSITION AND METHOD OF MAKING SAME

Robert K. Yang, Randolph, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed May 20, 1986, Ser. No. 865,509

Int. Cl.[4] A23G *3/30*

U.S. Cl. 426—3 **8 Claims**

1. A method of preparing a gum base composition in the absence of rosin esters or terpene components, which comprises:

heating said elastomer to a compatibilization temperature of about 220° C. to about 250° C. under low shear dissociating forces,

adding a high melting point compatibilization component consisting essentially of a wax having a melting point of about 130° F. to about 250° F. (121° C.) under conditions of mastication, temperature and low shear mixing until a substantially homogeneous plastic mass is formed, and

introducing a resin component under continued low shear mixing and mildly elevated temperature until said resin and said elastomer form a substantially homogeneous plastic mass.

4,876,096

RICE SYRUP SWEETENER

Cheryl R. Mitchell; Pat R. Mitchell, both of Manteca, Calif., and William A. Mitchell, Shelburne, Vt., assignors to California Natural Products, Manteca, Calif.

Division of Ser. No. 856,504, Apr. 28, 1986, Pat. No. 4,756,912.

This application Mar. 29, 1988, Ser. No. 174,598

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.[4] A23L *1/09, 1/05*

U.S. Cl. 426—28 **15 Claims**

1. A rice syrup sweetener product formed by a method comprising the steps of

selecting as a starting material a whole grain rice and dividing it into particles of reduced size,

liquifying the whole grain rice particles with an alpha-amylase enzyme in an aqueous medium substantially free from protease, in an amount and for a period of time sufficient to form a liquid slurry,

treating the liquid slurry with a glucosidase enzyme in a saccharification step in an amount and for a period of time less than about three hours for yielding a saccharification product have a glucose of content of about 5 to 70% solids,

clarifying the saccharification product to remove substantially all rice fiber to form a partially clarified product, and

concentrating the partially clarified product to produce the rice syrup sweetener product having a protein content on a dry-weight basis of less than about 3.5%, the product being colloidal or non-filtratable.

4,876,097

COMPOSITIONS FOR COATING FEEDING STUFF ADDITIVES INTENDED FOR RUMINANTS AND FEEDING STUFF ADDITIVES THUS COATED

Pierre Autant; Andre Cartillier, both of Commentry, and Raymond Pigeon, Francheville, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

Continuation of Ser. No. 810,778, Dec. 19, 1985, abandoned.

This application Sep. 2, 1987, Ser. No. 93,137

Claims priority, application France, Dec. 20, 1984, 84-19520; Dec. 20, 1984, 84-19521

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—74 **11 Claims**

1. A composition suitable for coating a bilogically active substance, which is stable at a pH greater than or equal to 5 and which permits the release of the biologically active substance at a pH less than or equal to 3.5, which composition comprises:

40 to 95% by weight of a film-forming, waterinsoluble binding agent which possesses controlled hydrophilicity and which may be slightly sensitive to pH variations, the said binding agent being selected from the group consisting of a combination of a water-insoluble filmforming cellulose derivative and an agent for controlling the hydrophilic/-hydrophobic balance selected from the group consisting of polyols in a weight ratio of cellulose derivative to polyol of from 1:1 to 1.5:1; zein; and a combination of zein and an agent for controlling the hydrophilic/hydrophobic balance selected from the group consisting of water-insoluble cellulose derivative in a weight ratio of 2:1 to 10:1;

and 60 to 5% by weight of a pH sensitive substance selected from the group consisting of a polymer or copolymer containing at least one basic amino group and having a nitrogen content between 2 and 14% selected from the group consisting of amino derivatives of cellulose, polymers of amino derivatives of acrylic and methacrylic acids, copolymers of styrene with a vinylpyridine, and chitosan.

4,876,098

METHOD OF ROLLING DOUGH

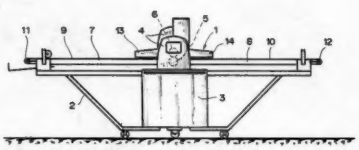
Eugen Morgenthaler, Kirchberg, Switzerland, assignor to Seewer AG, Burgdorf, Switzerland

Filed Nov. 24, 1987, Ser. No. 124,882

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1986, 3641286

Int. Cl.[4] A21C *3/02*

U.S. Cl. 426—231 **3 Claims**



1. In a process for rolling out a strip of dough, comprising the steps of passing the strip of dough on a dough-conveyor belt between a fixed dough roller and a movable dough roller a plurality of times, and after each pass of the strip of dough to be rolled out between the rollers moving the movable dough roller a specific distance toward the fixed dough roller by means of a controllable adjusting means so that the roller gap between the dough rollers decreases after each pass of the strip of dough, the improvement comprising controlling the adjusting means by a programmable circuitry and reducing the ratio

of one roller spacing to the next smaller roller spacing after at least one of said passing steps as the roller spacing decreases during the dough rolling process.

4,876,099

PROCESS FOR POPPING WILD RICE

Robert J. MacGregor; Darlene M. MacGregor, and Arnold Lueck, all of Aitkin, Minn., assignors to MacGregor Wild Rice Co., Aitkin, Minn.

Filed Jul. 25, 1988, Ser. No. 223,608
Int. Cl.[4] A21D *6/00*
U.S. Cl. 426—242 4 Claims

1. A process for puffing wild rice comprising:
(a) curing and parching the wild rice in a roasting oven to reduce its moisture content to a level of 4% to 12% by weight;
(b) scarifying the wild rice to remove the outer shell and bran from the kernels of the wild rice;
(c) grouping the wild rice by length and width so as to achieve a uniform size in each group;
(d) depositing the groups of wild rice separately on a heating surface and exposing the wild rice in each group to heat the wild rice to 500–800 degrees fahrenheit so that the moisture in the wild rice expands, causing the wild rice to puff;
(e) removing the wild rice from the heating surface after it has popped to avoid scorching; and
(f) permitting the wild rice to cool.

4,876,100

METHOD FOR PRODUCING MILK WITH A LOWERED BACTERIAL CONTENT

Sune Holm, deceased, late of Lund (Ingrid Birgitta Elisabet, née Jansson, Eva Christina Holm, Claes Frederick Holm, executors); Rolf Malmberg, Lund, and Kjell Svensson, S. Sandby, all of Sweden, assignors to Alfa-Laval Food and Dairy Engineering AB, Tumba, Sweden

Continuation-in-part of Ser. No. 857,745, Apr. 22, 1986, abandoned. This application Jun. 13, 1988, Ser. No. 206,126
Claims priority, application Sweden, Sep. 11, 1984, 8404545
Int. Cl.[4] A23C *1/00*
U.S. Cl. 426—491 9 Claims

1. A method for treating raw milk to produce treated milk having a lower bacterial content than the raw milk, in which raw milk is first divided by centrifugal separation into a fraction consisting of cream and a fraction consisting of skim milk, comprising the further steps of: (a) subjecting the skim milk fraction to microfiltration by passing the skim milk fraction through a microfilter having a retaining membrane surface, the pores in said microfilter having an average diameter of at least about 0.8μ and less than about 2.0μ, to yield a permeate which consists of skim milk with a lower fat globular, protein and bacterial content than the skim milk fraction, in which the microfiltration is carried out by directing the skim milk through a circulation path comprising the microfilter, at which the skim milk is directed to flow in a cross-flow filtration path, which is generally parallel with the retaining membrane surface during the microfiltration, (b) separating from the retaining membrane surface a retentate which consists of skim milk with a higher fat globular, protein and bacterial content than the skim milk fraction, (c) sterilizing the retentate, and (d) separately recovering the retentate, permeate and cream fractions.

4,876,101

SNACK FOOD INGREDIENT AND METHOD FOR MAKING SAME

Miles J. Willard, 229 North Loyd Cir., Idaho Falls, Id. 83402

Continuation of Ser. No. 883,519, Jul. 8, 1982, Pat. No. 4,756,920. This application Jun. 24, 1988, Ser. No. 210,878
The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.
Int. Cl.[4] A21D *10/00*
U.S. Cl. 426—549 5 Claims

1. A continuous process for producing a fried snack food, comprising the steps of:
a. grinding dry cereal grain kernels such that a major portion of the ground cereal grain passes through a U.S. No. 20 mesh screen and is retained upon a U.S. No. 100 mesh screen;
b. uniformly hydrating the ground cereal grain with water to form a grain/water slurry having a moisture content of from about 40% to about 70% water;
c. uniformly gelatinizing substantially all of the starch in the grain/water slurry by cooking the grain/water slurry at a temperature above the gelatinization temperature of starch to form a gel;
d. cooling the gel such that a major portion of the gelatinized starch therein is set back;
e. mixing the cooled gelatinized ground grain with dry snack food ingredients to form a dough;
f. forming the dough into individual snack food pieces; and
g. frying the individual snack food pieces;

4,876,102

POTATO BASED DOUGH CONTAINING HIGHLY PECTINATED CELLULOSIC FIBERS

Robert D. Feeney, Hawthorne, N.J.; Robert L. Prosise; Joseph McGrady, both of Cincinnati, Ohio, and Raymond L. Niehoff, West Chester, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 30, 1987, Ser. No. 139,527
Int. Cl.[4] A23L *1/217*
U.S. Cl. 426—550 22 Claims

1. An improved potato based dough comprising:
(a) 20% to 50% potato component based on dried potato weight, wherein said potato component has been adjusted to a reducing sugar content of from 0% to about 5%; an iodine index of from about 0.1 to about 6; and a lipid content defined by the relationship $Y=AX^{0.40}$, where Y is the lipid content of the dough in percent by weight of dehydrated potatoes, A has a value less than or equal to 2.70, and X is the dehydrated potato iodine index which ranges from about 0.01 to about 6; and
(b) 25% to 55% water; wherein said improvement comprises the including in said dough of from about 3% to about 20% of a fibrous cellulosic material, said cellulosic material having a water absorbency of between about 2 g water/g fiber and 25 g water/g fiber and having a pectin content of at least about 15%, said cellulosic material being derived from citrus whole peel, citrus albedo, citrus juice vesicle solids, citrus rag, dried citrus pulp, sugar beet pulp, apples, or mixtures thereof.

4,876,103

PROCESS FOR MAKING MEAT PRODUCTS CONTAINING A KONJAC MANNAN GEL

Ikuo Kawano; Tsuyoshi Takiguchi; Norihisa Kimura; Yohei Yanagisawa, all of Gunma; Tokuji Ashimi, and Hiroyuki Yoshino, both of Tokyo, all of Japan, assignors to Governor of Gunma-ken, Maebashi and Nakamuraya Co., Ltd., Tokyo, both of, Japan

Filed Oct. 29, 1987, Ser. No. 114,674

Claims priority, application Japan, Oct. 9, 1987, 62-255289

Int. Cl.[4] A23L *1/314, 1/317*

U.S. Cl. 426—574 8 Claims

1. A method for making a process meat product comprising the steps of: adding konjac powder to cold water under agitation to form a mixture, said konjac powder being added to said cold water in a weight ratio of 1:50 to 1:60; allowing the mixture to stand and be converted into a uniform paste; adding a coagulant to the paste, said coagulant consisting of a mixture of calcium hydroxide, sodium carbonate and potassium carbonate; steaming the paste for a time sufficient to coagulate the paste and form a konjac mannan gel; providing a meat; dividing the meat and konjac mannan gel into fine pieces while mixing said meat and konjac mannan gel; shaping the fine pieces into a shaped product; and thermally treating the shaped product.

4,876,104

METHOD FOR PREPARING AND PRESERVING FRESH PASTA

Michael McGuire, Elmhurst; Ralph DiGiacomo, Palisades; Marcia Palmer, Nanuet, and Louis Liggett, Brooklyn, all of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Dec. 22, 1987, Ser. No. 136,892

Int. Cl.[4] A23L *1/162*

U.S. Cl. 426—57 11 Claims

1. A process for preparing and preserving fresh pasta which maintains its freshness for up to 120 days without lowering the moisture to levels which prohibit growth of organisms which cause deterioration, comprising the steps of:

(a) preparing a uniform blend comprising flour and whole eggs having a moisture content of up to 30%;

(b) conditioning the uniform blend by compacting some to form a sheet of dough having a thickness of at least 0.03 inches;

(c) cutting the sheeted dough into a desired shape or form;

(d) subjecting the cut dough to dry heat for a time ranging from 10 seconds to 60 seconds and at a temperature ranging from 35° F. to about 425° to lower the moisture and partially dry the external surface of the compacted cut dough;

(e) contacting the cut dough with steam for a time and at at temperature sufficient to pasteurize said cut dough;

(f) cooling the pasteurized dough to a temperature of between about 30° F. and about 50° F.;

(g) packaging the cooled pasteurized dough in a modified atmosphere environment; and

(h) storing the packaged product for extended periods of time at temperatures ranging from about 40° F. to 50° F.

4,876,105

GELLAN GUM/GELATIN BLENDS

Carol L. Wolf, Solana Beach; William M. LaVelle, and Ross C. Clark, both of San Diego, all of Calif., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 9, 1988, Ser. No. 204,449

Int. Cl.[4] A23L *1/06, 1/04*

U.S. Cl. 426—573 7 Claims

1. A blend of gellan gum and gelatin in the with ratios of 1:20 to 1:50.

4,876,106

HIGHLY VERSATILE COMPREHENSIVE NUTRITIONAL COMPOSITION

Gail J. Sabatura, 38 Deanna Dr., Somerville, N.J. 08876

Continuation-in-part of Ser. No. 833,832, Feb. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 713,735, Mar. 20, 1985, abandoned. This application Nov. 30, 1987, Ser. No. 126,388

Int. Cl.[4] A23C *21/00*

U.S. Cl. 426—583 12 Claims

1. A comprehensive and versatile nutritional composition suitable for making varieties of food products including hot and cold drink, shakes, puddings, frozen bars, soups, salad dressings, dips, souffles and vegetables, said composition, comprising a separately maintained base mix and a separately maintained flavoring mix with an amount of said base mix being sufficient to provide an adequate amount of proteins, for a low calorie diet, said base mix including at least one dairy based constituent to provide bulk and flavor and further comprising a whey protein concentrate and at least one caseinate product having a low flavor profile, said flavoring mix including at least one flavoring agent said base mix or flavoring mix or both having thickening properties with said base mix and flavoring mix being highly water soluble and said base mix and flavoring mix being brought together in the presence of a sufficient quantity of water just prior to use, said varieties of food products being dependent upon the flavoring agent, amount of water, temperature and method of making.

4,876,107

SUBSTITUTE MILK FAT COMPOSITIONS

David M. King, Billericay, and Frederick B. Padley, Bedford, both of England, assignors to Unilever Patent Holdings BV, Rotterdam, Netherlands

Continuation of Ser. No. 884,931, Jul. 14, 1986, abandoned. This application Apr. 4, 1988, Ser. No. 178,880

Claims priority, application United Kingdom, Jul. 12, 1985, 8517677

Int. Cl.[4] A23C *11/00*

U.S. Cl. 426—601 10 Claims

1. A rearranged vegetable fat composition consisting essentially of a mixture of glycerides of unbranched and even-numbered fatty acids residues of which at least half in the 2-position are palmitic acid residues and in which those in the 1- and 3-positions are randomly distributed between these positions and consist essentially of unsaturated C_{16} and C_{18} fatty acid residues and no more saturated fatty acid residues than in the 2-position.

4,876,108

METHOD OF USING FAST PYROLYSIS LIQUIDS AS LIQUID SMOKE

Gary Underwood, Manitowoc, Wis., and Robert G. Graham, Nepean, Canada, assignors to Ensyn Engineering Associates Inc., Ontario, Canada

Filed Nov. 12, 1987, Ser. No. 119,673

Int. Cl.[4] A23L *1/221*

U.S. Cl. 426—650 17 Claims

1. A process of making an aqueous wood smoke flavored solution for use in foodstuffs comprising:

(1) heating in the absence of oxygen ground wood or cellulose to between 400° C. and 650° C. within 1.0 second;

(2) maintaining the said wood or cellulose together with the pyrolysis products produced from the said wood or cellulose between 400° C. and 650° C. for between 0.03 and 2.0 seconds;

(3) reducing the temperature of the pyrolysis products to below 350° C. within 0.6 seconds thereby obtaining a liquid extract;

(4) separating and collecting the liquid extract of the said pyrolysis products;

(5) diluting the said liquid extract with water to achieve a

partial phase separation and to obtain an aqueous wood smoke flavored solution having a benzo(a)pyrene concentration of less than 1.0 ppb and a browning index to phenol concentration greater than 8.9 to 1 and a ratio of hydroxyacetaldehyde to acetol greater than 5.5 to 1.

4,876,109

SOLUBLE COVERING FOR CARDIAC PACING ELECTRODE

David W. Mayer, Bloomington; Byron L. Gilman, Plymouth; Susan M. Walgren, Shoreview, and June M. Berglund, Forest Lake, all of Minn., assignors to Caridac Pacemakers, Inc., St. Paul, Minn.

Division of Ser. No. 37,684, Apr. 13, 1987, Pat. No. 4,827,940. This application Nov. 18, 1988, Ser. No. 272,912

Int. Cl.[4] A01N *1/02;* B05D *1/18, 3/02*

U.S. Cl. 427—2 3 Claims

1. A process for coating a fixation element of a body implantable electrode, including the steps of:

(a) selecting a biocompatible, non-pyrogenic material soluble in bodily fluids and having a melting point substantially above normal body temperature, and heating said material to a temperature slightly above its melting point;

(b) dipping a fixation element of a body implantable electrode into a solution of said material maintained at said temperature;

(c) removing said fixation member, along with an initial portion of said material adhering to said fixation member, from said solution and permitting them to cool a sufficient time to allow said first portion to at least partially solidify;

(d) dipping said fixation member and material portion, after said cooling, into said solution for a time sufficient to permit a subsequent portion of said material to adhere to said initial portion; and

(e) removing said fixation member, initial portion and subsequent portion from said solution, and permitting them to cool to an ambient temperature.

4,876,110

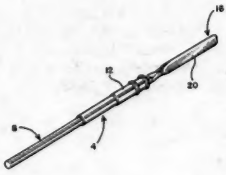
ELECTROSURGICAL KNIFE

G. Marsden Blanch, Sandy, Utah, assignor to American Medical Products, Inc., Murray, Utah

Division of Ser. No. 17,876, Feb. 24, 1987. This application Aug. 10, 1987, Ser. No. 83,245

Int. Cl.[4] A01N *1/02;* B05D *1/36, 7/00;* B21K *11/00*

U.S. Cl. 427—2 6 Claims



1. A method of fabricating an electrosurgical knife for use with a source of radio-frequency energy in cutting and cauterizing tissue, said method comprising

(a) providing an elongate stainless steel blade having a cutting edge at one end thereof, with the other end being coupleable to an energy source,

(b) abrading at least a portion of the surface of the blade,

(c) applying a first coat of primer material by dipping, to at least the cutting edge of the blade,

(d) baking the first coat,

(e) abrading the surface of the first coat,

(f) applying a second coat of non-stick material over the first coat by dipping, wherein the second coat is Teflon product 455-119, and

(b) baking the second coat.

4,876,111

METHOD FOR DEPOSITING A PRIMER OR SEALER OF PROGRAMMED COLOR ON AN OBJECT

Daniel Guyomard, Lamoriaye; Gérald Torrez, Liancourt; Jean-Michel Lambour, Pont-Sainte-Maxence, and Claude Arriveau, Argent-sur-Sauldre, all of France, assignors to B.A.S.F. Peintures & Encres S.A., France

Filed Oct. 6, 1987, Ser. No. 106,556

Claims priority, application France, Oct. 6, 1986, 86 13892

Int. Cl.[4] B05D *1/06, 1/34*

U.S. Cl. 427—31 7 Claims

1. A method of depositing by projection or spraying using a projection or spray device a primer or sealer of programmed color on an object comprising feeding independently to the projection or spray device a neutral primer base and at least one mono- or poly-pigmented paste said base and said paste being fed in such a manner as to cause them to be mixed in the device simultaneously while being projected or sprayed on said object, whereby said neutral primer base and said pigmented paste are mixed in order to constitute said primer at substantially the moment the primer is deposited on said object.

4,876,112

PROCESS FOR FORMING METALLIC PATTERNED FILM

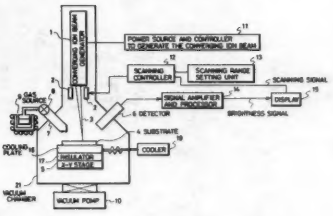
Takashi Kaito, and Tatsuya Adachi, both of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

Filed Mar. 27, 1987, Ser. No. 31,946

Claims priority, application Japan, May 29, 1986, 61-124146

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—38 22 Claims

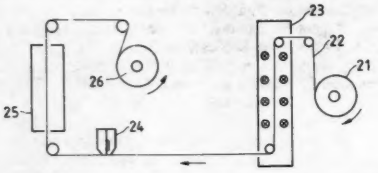


1. A process for forming a new wiring path on a semiconductor device, comprising: providing a semiconductor device having a designated area on which a new wiring path is to be formed; forming a layer of decomposable carbonyl metal compound composed of carbonyl and metal components on the designated area of the semiconductor device by directing a vapor stream of decomposable carbonyl metal compound onto the designated area; and converting the layer of decomposable carbonyl metal compound into a new wiring path on the designated area of the semiconductor device by irradiating the layer with a focused ion beam to decompose the carbonyl metal compound layer into a gaseous carbonyl component which dissipates and a solid metal component which deposits as the new wiring path on the semiconductor device.

4,876,113
METHOD FOR PRODUCING MAGNETIC RECORDING MEDIA

Tadashi Yasunaga, and Koji Sasazawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 12, 1988, Ser. No. 192,981
Claims priority, application Japan, May 15, 1987, 62-118521
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—39 **17 Claims**

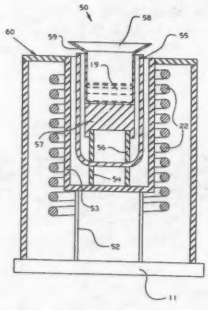


1. A method for producing a magnetic recording medium comprising the steps of: forming a magnetic metal thin film on at least one side of a nonmagnetic substrate; exposing a surface of said thin film to a glow discharge atmosphere; and immediately forming a protective lubricant layer on said thin film.

4,876,114
PROCESS FOR THE SELF FRACTIONATION DEPOSITION OF A METALLIC LAYER ON A WORKPIECE

Richard R. Phinney, South Hero, and David C. Strippe, Waterbury Center, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 100,068, Sep. 23, 1987, Pat. No. 4,791,261. This application Aug. 29, 1988, Ser. No. 237,193
Int. Cl.[4] B05D *3/02*; C23C *16/06*
U.S. Cl. 427—45.1 **6 Claims**



6. A process for the self-fractionation deposition of a metallic layer on a workpiece consisting of the steps of:

depositing a body of copper in a molybdenum crucible which body is less than five-eights of the volume of the crucible,

shielding the workpiece from the crucible with a removable shield,

applying RF power to the crucible to heat the body of copper contained therein to a stable temperature of about 1200° C.,

increasing the RF power applied to the crucible and the body of copper, to increase the temperature of the charge about 1900° C.,

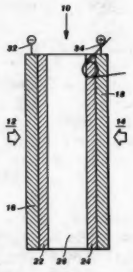
lowering the power level applied to the device to lower the temperature of the body of copper to 1510° C., and

removing the shield from between the crucible and the workpiece to permit evaporant from the body of copper to coat the workpiece.

4,876,115
ELECTRODE ASSEMBLY FOR USE IN A SOLID POLYMER ELECTROLYTE FUEL CELL

Ian D. Raistrick, Los Alamos, N. Mex., assignor to United States Department of Energy, Washington, D.C.

Division of Ser. No. 9,843, Jan. 30, 1987, abandoned. This application Mar. 3, 1988, Ser. No. 163,672
Int. Cl.[4] H01M *4/86*
U.S. Cl. 427—115 **4 Claims**



1. A method for treating porous gas diffusion electrodes having a catalyst loading less than 0.50 mg per square centimeter supported on carbon particles defining catalytic sites within said electrode for effective use with a solid polymer electrolyte membrane, comprising the steps of:

forming a solution containing a proton conductive material selected from a group consisting of a perfluorocarbon copolymer and ruthenium dioxide at a dilution effective for said proton conductive material to deposit adjacent said catalytic sites within said electrode; and

dispersing said solution over said electrode in a manner effective for said proton conductive material to penetrate to within said electrode adjacent said catalytic sites.

4,876,116
METAL CONDUCTORS WITH IMPROVED SOLDERABILITY

Ashok K. Mehan, Union City, and Hans E. Lunk, Menlo Park, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Sep. 11, 1986, Ser. No. 906,355
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—118 **17 Claims**

1. A method of making an insulated metal wire having improved retention of solderability on storage, which method comprises

(1) applying a solution of a surface active agent in a liquid carrier to the surface of the wire; and

(2) after step (1), surrounding the wire with a layer of a polymeric insulating composition, the layer being formed by melt extrusion of a polymeric insulating composition around and against the surface of the wire carrying the surface active agent or by wrapping a tape of a polymeric insulating composition around and against the surface of the wire carrying the surface active agent;

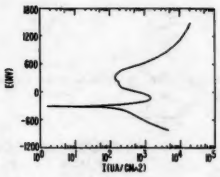
the surface active agent and the conditions of the method being such that the insulated wire has improved retention of solderability on storage.

4,876,117

METHOD AND COATING TRANSITION METAL OXIDE ON THIN FILM MAGNETIC DISKS

Jonathan G. Bornstein, Mountain View, Calif., assignor to Domain Technology, Milpitas, Calif.

Filed Feb. 4, 1988, Ser. No. 152,119
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—130 13 Claims



1. A method for forming a protective coating over the surface of a magnetic recording disk, said method comprising:

applying a uniform layer of a liquid metal oxide precursor solution over the surface of the magnetic recording disk, said metal being selected from the group consisting of Groups IVB, VB and VIB of the Periodic Table and aluminum, indium, and tin; and

heating the layer on the disk to a temperature in the range from about 100° to 300° C. for a sufficient time to convert the precursor to a hardened layer of the corresponding metal oxide.

4,876,118

NEGATIVE CORRECTION OF GRAVURE PRINTING PLATES

Guenter Wallbillich, Neustadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 25, 1988, Ser. No. 174,359
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710145
Int. Cl.[4] B32B *35/00*
U.S. Cl. 427—142 13 Claims

1. A method for the negative correction of gravure printing plates by filling undesirable depressions in the printing layer of the gravure printing plate with a correcting agent, wherein the correcting agent used is a pasty material which is viscoplastic at room temperature and is based on a dispersion of a solid, highly fluorinated olefin polymer powder in an inert, sparingly volatile, chemically stable, highly heat stable, organic dispersing liquid having a boiling point above 150° C.

4,876,119

METHOD OF COATING A NITRIDE CERAMIC MEMBER

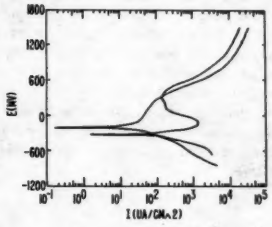
Hiromitsu Takeda; Masako Nakahashi; Makoto Shirokane, and Tatsuo Yamazaki, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 11, 1988, Ser. No. 167,237
Claims priority, application Japan, Mar. 13, 1987, 62-56850; Mar. 13, 1987, 62-58103; Mar. 13, 1987, 62-58104
Int. Cl.[4] C23C *16/00*
U.S. Cl. 427—250 18 Claims

1. A method of coating a nitride ceramic member, comprising the steps of:

activating a surface of said nitride ceramic member by subjecting the member to a high temperature in a vacuum; and

bringing a metal vapor, which is reactable with an element present in the nitride ceramic member, into contact with the activated surface of the nitride ceramic member to form a layer thereon comprised of a reaction product of an



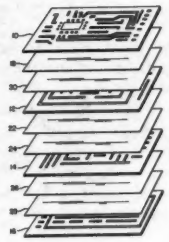
element present in the nitride ceramic member and the metal vapor, on the activated surface.

4,876,120

TAILORABLE MULTI-LAYER PRINTED WIRING BOARDS OF CONTROLLED COEFFICIENT OF THERMAL EXPANSION

Robert E. Belke, Clay; Louis Zakraysek, Cicero, and Walter O. Pillar, New Hartford, all of N.Y., assignors to General Electric Company, Coshocton, Ohio

Filed Apr. 21, 1987, Ser. No. 40,981
Int. Cl.[4] C09K *19/00;* B32B *15/04;* H01B *5/00;* H05K *1/00*
U.S. Cl. 428—1 27 Claims



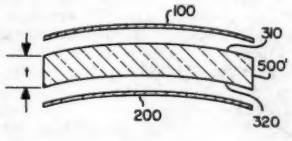
1. In a multi-layer printed wiring board (MLPWB) made from laminates with bonding sheets therebetween, the improvement which comprises at least one layer thereof formed from a liquid crystalline polymer selected from the group consisting of poly(para-phenylene benzobisthiazole), poly(-para-phenylene benzobisoxazole), poly(2,5-benzothiazole), poly(2,5-benzoxazole), and mixtures thereof.

4,876,121

COSMETIC ARTIFICIAL NAILS

Allen L. Cohen, 10010 Walsham Ct., Richmond, Va. 23233

Filed Sep. 30, 1988, Ser. No. 252,262
Int. Cl.[4] A01N *1/00*
U.S. Cl. 428—15 41 Claims



1. An artificial fingernail or toenail wherein such is useful for superposition on a natural fingernail or toenail and comprises:

(a) a primary substrate layer, forming the nail bed, that is

transparent or partially transparent and has an upper surface and a lower surface, said surfaces separated by the physical thickness of the substrate material itself, said thickness functioning to allow for a parallax effect;

(b) a first grid pattern layer having a first grid pattern therein containing opaque or partially opaque regions within said first pattern, said first grid pattern layer superposed on the lower surface of the primary substrate layer; and

(c) a second grid pattern layer having a second grid pattern therein containing transparent or partially transparent regions within said second pattern, said second grid pattern layer superposed on the upper surface of the primary substrate layer.

4,876,122

PACKAGE CAPABLE OF PREVENTING FOAM FORMATION, METHOD OF MANUFACTURING SUCH A PACKAGE, AND ANTIFOAMING AGENT

Martin Hellsten, Ödsmål, Sweden, assignor to Berol Kemi AB, Stenungsund, Sweden

Filed Mar. 22, 1988, Ser. No. 171,745

Claims priority, application Sweden, Apr. 6, 1987, 8701429

Int. Cl.[4] B65D *85/72*; D21H *1/40*

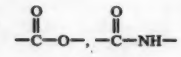
U.S. Cl. 428—34.1 **14 Claims**

1. A package capable of preventing foam formation when being filled with liquid aqueous products, characterized in that at least a part of the inner side of the material forming the package is coated with an antifoaming agent comprising an antifoaming, water-insoluble compound encapsulated in crystalline urea.

4. The package as claimed in claim 1, wherein the antifoaming, water-insoluble compound is of the general formula

$$R[X(A_1)_{n1}(A_2)_{n2}]_mH \qquad I$$

wherein R is a hydrocarbon group having 1–30 carbon atoms, hydrogen or a group of the formula $R_1(A_3)_{n3}$ wherein R_1 is hydrogen or a hydrocarbon group having 1–30 carbon atoms, A_3 is an alkylenoxy group having 2–4 carbon atoms, n_3 is 0 to 30, X is —O—,



or —S—, A_1 and A_2 are each an alkylenoxy group having 2–4 carbon atoms, n_1 and n_2 are each 0 to 100, m is 1–4, n_1, n_2, n_3 and m being so selected that the number of alkylenoxy groups is from 15 to 120.

4,876,123

TAMPER INDICATING TAPE AND DELAMINATING FILM THEREFORE

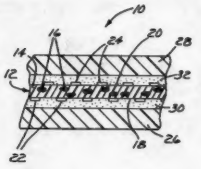
Raymond R. Rivera, Cottage Grove; Stephen B. VanVleet, Woodbury, and Shari J. Wilson, Minneapolis, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 27, 1988, Ser. No. 212,412

Int. Cl.[4] B32B *7/10*

U.S. Cl. 428—34.2 **19 Claims**

1. A light transmissive film derived from a composition comprising 50 to 85 parts per weight of a first copolymer comprising at least one moiety derived from at least one olefinic monomeric unit and 50 to 15 parts by weight of a second copolymer comprising at least one moiety derived from at least one vinyl alcohol monomeric unit and said second copolymer being sufficiently incompatible with said first copolymer to



form two phases within said film, one of said phases being continuous.

4,876,124

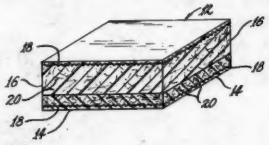
UNDERGROUND TANK

Barry J. Dallum, Montgomery, Tex., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 914,977, Oct. 3, 1986, abandoned. This application Jun. 16, 1988, Ser. No. 208,333

Int. Cl.[4] B65D *90/02*; B65G *5/00*

U.S. Cl. 428—34.5 **11 Claims**



1. A storage tank particularly adapted for use underground and having a composite wall consisting of a first layer of a non-hydrolyzable resin, a second layer of a first glass fiber mat, a third layer of a non-hydrolyzable resin reinforced with chopped glass strands, a fourth layer of a resin resistant to corrosion by gasoline or alcohol, and reinforced with chopped glass strands, a fifth layer of a second glass fiber mat, and a sixth layer of a resin resistant to corrosion by gasoline and alcohol.

4,876,125

GUSSET BAG FOR PHOTOGRAPHIC PHOTOSENSITIVE MATERIALS

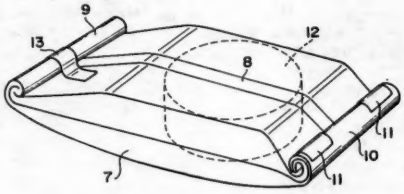
Mutsuo Akao; Hiroyuki Osanai, and Koji Inoue, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 22, 1988, Ser. No. 222,783

Claims priority, application Japan, Jul. 22, 1987, 62-181188

Int. Cl.[4] B65D *85/00*; B32B *27/04*

U.S. Cl. 428—35.2 **3 Claims**



1. A single-sheet gusset bag of laminate construction for photographic photosensitive materials comprising a laminated

sheet of which the inner surface layer is a light-shielding polyolefin resin film layer and the outer surface layer is a heat-resistant flexible sheet layer, and having a bottom seal portion fixed by a hot-melt adhesive having a softening point determined by ring and ball method of 75 to 115 C of which the coating amount of the hot melt adhesive in the center portion of the bottom seal portion of said gusset bag is less than the coating amount of the side portion of the bottom seal portion of said gusset bag.

4,876,126

MEDICAL INSTRUMENT AND METHOD FOR MAKING

Naoto Takemura, and Susumu Tanabe, both of Fujinomiya, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 11,441, Feb. 5, 1987, abandoned, which is a continuation of Ser. No. 741,226, Jun. 4, 1985, abandoned. This application Sep. 1, 1988, Ser. No. 240,365

Claims priority, application Japan, Jun. 4, 1984, 59-114267; Aug. 7, 1984, 59-165455

Int. Cl.[4] A61F *5/42*; A61M *25/00*

U.S. Cl. 428—35.7 **26 Claims**

1. A medical instrument comprising:

a substrate inherently having a reactive functional group on a surface thereof;

a water soluble polymer selected from the class consisting of a cellulosic polymer, a maleic anhydride polymer, and a water soluble nylon, or a derivative thereof, said water soluble polymer being covalently bonded with said reactive functional group, said surface exhibiting lubricity when wetted with aqueous fluid.

4,876,127

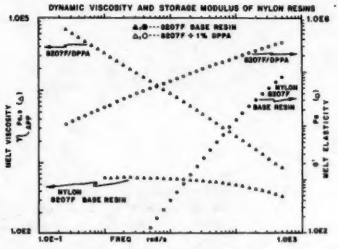
METHOD OF BLOW MOLDING POLYAMIDES

Yash P. Khanna, Cedar Knolls; Himangshu R. Bhattacharjee, Randolph; Rakesh Kumar, Budd Lake; Jon I. Williams, Montclair, and John P. Sibilia, Livingston, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 9, 1988, Ser. No. 269,030

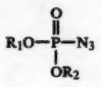
Int. Cl.[4] B27N *5/02*

U.S. Cl. 428—35.7 **20 Claims**



1. A process for blow molding polyamides which comprises the steps of:

(a) forming a molten mixture of one or more polyamides and an effective amount of one or more aryl phosphoryl azide compunds of the formula:



wherein:

R_1 is selected from the group consisting of phenyl or phenyl substituted with one or more substituents which are inert under process conditions: and

R_2 is selected from the group consisting of alkyl, haloalkyl, nitroalkyl, hydrogen, a metal or non-metal cation or R_1 substituents:

(b) placing said molten mixture into a mold having a predetermined configuration:

(c) introducing gas into said mold to form a hollow molten mixture preform having the configuration of said mold: and

(d) cooling said molten preform to form a hollow article having the configuration of said mold.

4,876,128

STITCHBONDED NONWOVEN FABRIC

Dimitri P. Zafiroglu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 31, 1989, Ser. No. 331,136

Int. Cl.[4] B32B *3/06*

U.S. Cl. 428—102 **6 Claims**

1. An improved stitchbonded fabric having a nonwoven fibrous layer and spaced apart rows of stitches with a row spacing in the range of 2 to 10 rows per centimeter formed by a stitching yarn that amounts to 2 to 20 percent of the total weight of the fabric, the improvement comprising

the fibrous layer being composed of bonded fibers,

10 the stitch spacing within each row being in the range of 1 to 7 stitches/cm and

the fabric having a specific volume of at least 16 cubic centimeters per gram and an extensibility in the direction of the stitching in the range of 10 to 75%.

4,876,129

PACKAGING MATERIAL FOR PHOTOGRAPHIC PHOTOSENSITIVE MATERIALS

Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

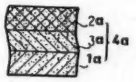
Filed Jun. 22, 1987, Ser. No. 64,654

Claims priority, application Japan, Jun. 23, 1986, 61-144758; Jun. 23, 1986, 61-144759

The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.

Int. Cl.[4] B29D *22/00*

U.S. Cl. 428—359 **6 Claims**



1. A packaging material for photographic photosensitive materials which comprises a multiple layer light-shielding film which is simultaneously coextruded in the absence of a support, said film comprising an inner layer which is a heat-sealing layer containing 30 to 99.49 wt. % of linear low density polyethylene resin, 0.5 to 10 wt. % of carbon black and 0.01 to 1 wt. % of a lubricant, and having a static friction coefficient of 0.12 to 0.37 and an outer layer formed of a thermoplastic resin having a static friction coefficient of 0.19 or more and which is greater than said inner layer by 0.05 or more, and having a

binding strength of 10 g/15 mm width or more between the layers of said coextruded multiple layer film.

4,876,130

BITUMINOUS COMPOSITION AND USE THEREOF AS COLD-APPLICABLE SELF-ADHESIVE COMPOUND

Willem C. Vonk, and Gerrit van Gooswilligen, both of CM Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 25, 1986, Ser. No. 899,856

Claims priority, application United Kingdom, Mar. 20, 1986, 8606903

Int. Cl.[4] B32B *11/02, 11/10, 27/20;* C08L *95/00*

U.S. Cl. 428—40 10 Claims

1. A bituminous composition comprising:

(a) from 99 to 85%w of a mixture of:

(1) 45 to 99.8%w of a bituminous component having a penetration of at least 800 dmm and a viscosity within the range of 2000 to 8000 poise as determined by ASTM D 2171;

(2) 0.1 to 30%w of a lithium salt of a C_{10-40} fatty acid or hydroxy fatty acid;

(3) 0.1 to 25%w of an elastomer; and

(b) from 1 to 15%w of an amorphous silica filler.

7. A protective membrane which contains a layer of protective material and an adhesive layer of the composition according to claim 1.

4,876,131

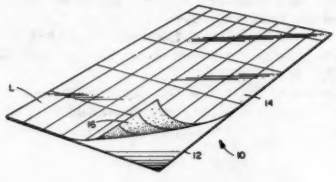
CONTINUOUS FORM WITH RELEASABLE LABEL

Robert E. Ashby, Quakertown, Pa., and Walter G. Greig, Lewiston, N.Y., assignors to Moore Business Forms, Inc., Grand Island, N.Y.

Continuation-in-part of Ser. No. 153,946, Feb. 9, 1988, abandoned. This application Aug. 18, 1988, Ser. No. 233,373

Int. Cl.[4] B32B *3/10, 7/06*

U.S. Cl. 428—42 9 Claims



1. A continuous form paper product, comprising:

a continuous form carrier sheet formed of paper uncoated with a release type coating on its opposite sides and per se suitable for processing through business machines;

first and second sets of a plurality of forms each, said first and second sets of forms being disposed on opposite sides of said carrier sheet, respectively; and

transfer adhesive means disposed between said carrier sheet and said first set of forms on one side of said sheet and between said carrier sheet and said second set of forms on the opposite side of said sheet for releasably securing said carrier sheet and said form sets one to the other whereby, upon removal of the forms from the opposite sides of said carrier sheet, the carrier sheet per se may be processed through business machines.

4,876,132

METHOD AND APPARATUS FOR INSTALLING AUTOMOBILE GLAZING

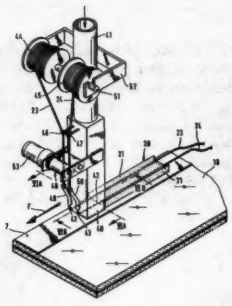
Heinz Kunert, Cologne, Fed. Rep. of Germany, assignor to Saint-Gobain Vitrage, Courbevoie, France

Filed Jul. 8, 1988, Ser. No. 216,926

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1987, 3722657

Int. Cl.[4] E06B *7/00*

U.S. Cl. 428—43 16 Claims



9. An automobile glazing intended for direct gluing comprising on its edge a profile bead (20), in which at least two flexible wires (23, 24, 25, 26, 27, 28, 29) are located at different positions in said bead with ends that exit laterally from said bead, said wires being adapted to shear different parts of said bead, whereby by pulling successively on the ends of said wires, said wires are used to shear said bead.

4,876,133

OPTICAL DATA RECORDING SYSTEM AND METHOD OF PRODUCTION OF RECORDING MEDIUM

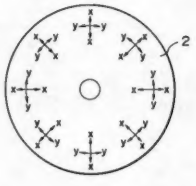
Toshinori Sugiyama, Ibaraki; Tetsurou Ikegaki, Tokushima; Mitsuru Shimizu, and Yoshitane Tuburaya, both of Toride, all of Japan, assignors to Hitachi Maxell, Ltd., Ibaraki, Japan

Filed Nov. 12, 1987, Ser. No. 119,471

Claims priority, application Japan, Nov. 14, 1986, 61-269905; Dec. 12, 1986, 61-294983

Int. Cl.[4] B32B *3/02;* G11B *5/66*

U.S. Cl. 428—64 16 Claims



1. An optical data recording medium comprising a transparent substrate, and a selected one of a recording film and a reflection film on one side of the transparent substrate for recording and/or reproducing data by radiating a light beam on said selected one of the recording film and the reflection film, wherein a given principal dielectric axis of the transparent substrate is set in regular manner within ±5 degrees of at least a selected one of the directions parallel, perpendicular and 45 degrees to a scanning direction of the light beam.

4,876,134

LAMINATED PANEL HAVING A STAINLESS STEEL FOIL CORE AND A PROCESS FOR PRODUCING THE PANEL

Yoshiro Saitoh, Nishinomiya, and Takashi Tatsumi, Moriyama, both of Japan, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 5, 1987, Ser. No. 105,071

Claims priority, application Japan, Oct. 6, 1986, 61-237738; Oct. 6, 1986, 61-237739; Oct. 13, 1986, 61-242336; Oct. 30, 1986, 61-259592; Nov. 8, 1986, 61-265835

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—73 12 Claims

1. A stainless steel foil core for use in a laminated panel which consists of

a plurality of strips of stainless steel foil, each of said strips being bent in a repeating outward and inward pattern along a plurality of parallel lines extending perpendicular to the length of said strips, the bending step forming rectangular-like depressions in the strips defined by the plurality of lines which are parallel to one another;

adhesive material interposed between said strips at spaced intervals along the length of said strips so as to bond said plural strips together at said spaced intervals, said bonded strips defining a plurality of cells each having an equal number of sides.

4,876,135

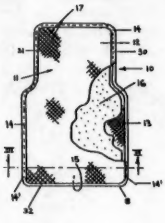
FLOOR MAT WITH DISPOSABLE ABSORBENT PAD

Blair McIntosh, P.O. Box 69, Waterville, Quebec, Canada

Continuation-in-part of Ser. No. 934,497, Nov. 24, 1986. This application Dec. 14, 1987, Ser. No. 133,646

Int. Cl.[4] B47G *27/02;* B32B *1/06*

U.S. Cl. 428—74 13 Claims



1. A floor mat comprising a jacket member formed by a pair of opposed sheets secured to each other along a predetermined peripheral edge portion to define a throat opening in an unsecured edge portion of said opposed sheets for access to the area therebetween, at least a top one of said sheets being formed of a non-absorbing, strong, water-resistant material having a plurality of openings therein for the passage of solid and liquid foreign matter, and an insert sheet of absorbent material disclosed between said opposed sheets through said mouth opening for the retention of said foreign matter disposed thereon through said openings in said top sheet, said insert sheet having at least a top surface thereof formed with embossements to trap foreign matter and arrest the flow of liquids deposited thereon through said openings, said insert sheet being constructed of a reinforced, highly-absorbent material having a bottom surface coated with a water-resistant material, said top sheet having an outer surface supported and separated over (a) said top surface of said insert sheet to protect said top surface of said absorbent sheet from being damaged by the feet of a person when applied to said outer surface and further to prevent objects resting on said outer surface from becoming soiled by liquids disposed spaced below said outer surface and resting on said top surface of said absorbent material.

4,876,136

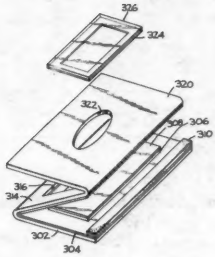
LIPSTICK SAMPLING DEVICE

Robert W. H. Chang, Roseville, Minn., and Keith E. Relyea, St. Joseph Township, St. Croix County, Wis., assignors to Minnesota Mining and Manufacturing Company, St Paul, Minn.

Filed Jun. 22, 1987, Ser. No. 64,862

Int. Cl.[4] B32B *3/04;* A45D *40/00*

U.S. Cl. 428—130 19 Claims



1. A multilayered structure for sampling cosmetic compositions containing at least 5% by weight of emollients or waxes, said structure comprising a carrier sheet, a window sheet and a cover sheet, said carrier sheet having a portion of at least one surface thereof with a coating of said cosmetic composition thereon, said window sheet having a hole therein which exposes at least a portion of said coating of cosmetic composition, and said cover sheet covering said hole in said window sheet wherein said carrier sheet, window sheet and cover sheet are portions of the same sheet formed by two folds of said same sheet to form a Z cross section.

4,876,137

POLYETHYLENE NAPHTHALATE FILM FOR HIGH-DENSITY MAGNETIC RECORDING MEDIA OF FLOPPY DISK

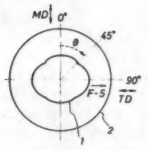
Shigeo Utsumi, Yokohama, Japan, assignor to Diafoil Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 941,837, Dec. 15, 1986, abandoned. This application Sep. 18, 1987, Ser. No. 98,319

Claims priority, application Japan, Dec. 17, 1985, 60-283843

Int. Cl.[4] G11B *5/64*

U.S. Cl. 428—141 11 Claims



1. A biaxially oriented three-layered polyethylene naphthalate film of not less than 30 μm in thickness for high-density magnetic recording media of floppy disks, which comprises a polyethylene naphthalate intermediate layer and two polyethylene naphthalate surface layer containing 0.01 to 1 wt. % inactive fine particles having a primary particle diameter of

0.001 to 1.5 μm, and has a tensile stress at 5% elongation in the range of 13 to 21 kg/mm² in any direction on the film, a Young's modulus in the range of 500 to 800 kg/mm² in any direction on the film, a heat shrinkage of less than 2.5% in any direction, a center line average roughness Ra of not more than 0.012 μm and not more than 10 coarse protuberances of not lower than 1.08 μm high per 25 cm², and each of the deviations of said tensile stresses at 5% elongation, Young's moduli and heat shrinkages is not more that 20%.

4,876,138

SYNTHETIC LEATHER-LIKE MATERIAL

Linda F. Bailey, Doug Hill Rd., Island, Ky. 42350

Filed Mar. 1, 1988, Ser. No. 162,810

Int. Cl.⁴ B32B *27/02, 27/08, 00/12, 00/30*

U.S. Cl. 428—172 **8 Claims**

1. A synthetic leather-like material, comprising:

A. a woven fabric base;

B. an acrylic paint layer in contact with the fabric base;

C. a clear polymer layer over the paint layer; and

D. a silicone layer over the clear polymer layer.

4,876,139

FILM FOR PRINT LAMINATES AND THERMOCOMPRESSION BONDING PROCESS THEREFOR

Takeshi Yamamoto; Kunio Kondo; Hiroshi Yoshimura; Yoshihiro Wada, and Fusazo Wada, all of Shiga, Japan, assignors to Gunze Kabushiki Kaisha, Kyoto, Japan

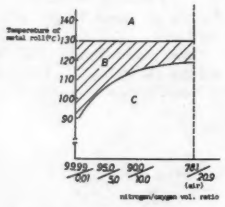
PCT No. PCT/JP87/00197, § 371 Date Oct. 30, 1987, § 102(e) Date Oct. 30, 1987, PCT Pub. No. WO87/06188, PCT Pub. Date Oct. 22, 1987

PCT Filed Mar. 30, 1987, Ser. No. 143,135

Claims priority, application Japan, Apr. 10, 1986, 61-83147

Int. Cl.⁴ B32B *3/00, 5/16*

U.S. Cl. 428—200 **10 Claims**



1. A film for print laminate use with absence of darkening or color change of a print upon lamination thereon, said film being bondable to a print by thermocompression and which comprises a film substrate and a heat-sensitive adhesive resin layer, said adhesive resin layer being chemically composed of polyethylene, an ethylene copolymer containing at least 70 wt. % of ethylene or a mixture of polymers at least 70 wt. % in total ethylene content, and being surface-treated by corona discharge in a nitrogen gas atmosphere having an oxygen concentration of less than 20.9 vol. %, wherein the improvement comprises the random incorporation of a finely divided white material into said adhesive resin layer in an amount of 0.2 to 3 wt. %, said finely divided white material having a mean particle size of 0.2 to 20 microns.

4,876,140

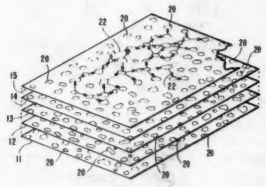
LAMINATE CONDUCTING PLASTIC

John Quackenbush, Hoover, Ala., assignor to FBK International Corporation, Birmingham, Ala.

Filed Jun. 24, 1987, Ser. No. 66,617

Int. Cl.⁴ B32B *5/16;* H01G *4/08*

U.S. Cl. 428—216 **12 Claims**



1. An article of multi-layered structure comprising a plastic resin including a multitude of particles dispersed in it, said resin being formed into a plurality of sublayers, each having a thickness on the order of thousandths of an inch or less and the particle size being about equal to the thickness of said sublayer or less to position the particles dispersed in each sublayer therein in close proximity to those dispersed in adjacent sublayers to provide relatively high electrically conducting paths through the particles in said plurality of sublayers.

4,876,141

DOUBLE LAYER PAVEMENT MARKING SHEET MATERIAL

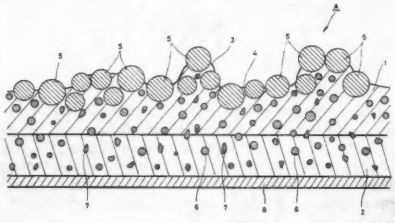
Sadao Kobayashi, Chiba; Yuji Ishihara, Tochigi; Katsuyuki Sato, Tochigi, and Kouichi Ijichi, Tochigi, all of Japan, assignors to Seibulite International Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,827

Claims priority, application Japan, Jul. 17, 1987, 62-178558

Int. Cl.⁴ B32B *7/02, 5/16*

U.S. Cl. 428—217 **3 Claims**



1. A double layer pavement marking sheet material comprising a base sheet made of rubber or synthetic resin in which a multiplicity of glass microspheres are embedded, said base sheet comprising:

an upper layer in which said glass microspheres are embedded in such a manner that a multiplicity thereof are partially exposed from the surface of the base sheet; and

a lower layer being softer and less restorable than the upper layer and having hardness within a range of 30°–75° and restoration rate of 50% or less.

4,876,142

FLUID RESISTANT COATING COMPOSITION

Alessandro Piccirillo, Yonkers, N.Y., assignor to Magic Stuff, Inc., Yonkers, N.Y.

Division of Ser. No. 40,012, Apr. 17, 1987, Pat. No. 4,845,144.
This application Apr. 5, 1989, Ser. No. 333,372
Int. Cl.[4] D03D *3/00*
U.S. Cl. 428—224 21 Claims

1. A flexible coated product which comprises:

(1) a coating composition comprising

(a) from about 1–2 parts by volume of a liquid latex polymer suspension of a blend of polyvinyl acetate/acrylic resin esters dispersed in an aqueous solvent to impart an increased level of flexibility to said composition;

(b) from about 3–4 parts by volume of an acrylic emulsion to serve as a film-forming binder for said composition;

(c) from about 1–2 parts by volume of a powdered gypsum-based compound to impart a required degree of strength and durability to said coating composition and to absorb substantially a major portion of said aqueous solvent which comprises said liquid latex polymer suspension; and

(d) from about 1–3 parts by volume of a glue to bond together said polymer suspension, said acrylic emulsion and said powdered, gypsum-based compound and to faciliate adhesion of said coating composition to a substrate to which said coating composition is to be applied; and

(2) a reinforcing material,

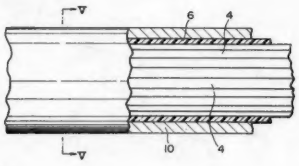
wherein said coating composition is applied to said substrate to form a flexible coated product.

4,876,143

ROD MATERIAL

Minoru Sugita; Teruyuki Nakatsuji; Tadashi Fujisaki; Minoru Sawaide; Noboru Ishikawa, and Yasuo Inada, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo; Dainihon Glass Industry Co., Ltd., Sagamihara and Kyojin Rope Manufacturing Co., Ltd., Kuki, all of, Japan

Filed Jul. 3, 1986, Ser. No. 881,697
Claims priority, application Japan, Jul. 5, 1985, 60-148010
Int. Cl.[4] D02G *3/00*
U.S. Cl. 428—294 17 Claims



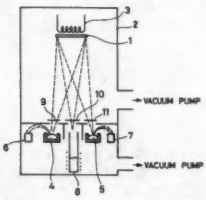
1. A rod material for use as a building material, comprising: an elongated matrix formed of a synthetic resin in which is embedded a plurality of first elongated textile elements and a plurality of second elongated textile elements all mutually parallel to each other along the length of the rod, each of said first elements being composed of a plurality of yarns braided together and said second elements having a lower breaking elongation rate than said first elements.

4,876,144

SINGLE CRYSTAL THIN FILM

Kenzo Susa; Kazumasa Takagi; Toshio Kobayashi, all of Nishitama; Takanobu Takayama, Hachioji, and Norio Ohta, Iruma, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 22, 1987, Ser. No. 111,283
Claims priority, application Japan, Oct. 22, 1986, 61-249625
Int. Cl.[4] G11B *7/24;* B32B *9/00*
U.S. Cl. 428—336 12 Claims



1. A single crystal thin film of a Heusler alloy having a magneto-optical effect and a crystalline structure of an MgAgAs type, wherein said thin film is a single crystal formed in at least one layer on a single crystal substrate.

4,876,145

PLATED RESIN ARTICLE

Tetsuro Maeda; Fukuaki Wada; Susumu Ohoka, and Akihiro Okamoto, all of Chiba, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 700,222, Feb. 11, 1985, Pat. No. 4,732,807.
This application Jul. 10, 1987, Ser. No. 71,954
Claims priority, application Japan, Feb. 9, 1984, 59-22647
Int. Cl.[4] B32B *15/06, 15/08, 27/08*
U.S. Cl. 428—327 2 Claims

1. A metal plated resin article formed by subjecting to wet metal plating a molded article formed of a transparent resin mixture comprising (A) 16 to 96% by weight of a graft copolymer produced by grafting onto a conjugated diene rubber, a vinyl cyanide monomer and an aromatic vinyl monomer, said graft copolymer containing 25 to 62.5% by weight of said rubber, and (B) 4 to 84% by weight of vinyl cyanide/aromatic vinyl compound copolymer resin, wherein said graft copolymer constitutes from 10 to 24% by weight of the conjugated diene rubber, based on the total weight of the transparent resin mixture, and has a weight average particle of 150 mμor less, and the copolymer of a vinyl cyanide monomer and an aromatic vinyl monomer is present as a continuous resin phase, said continuous resin phase copolymer not containing a component having an ester bond.

4,876,146

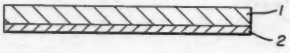
ANTI-FOGGING MULTILAYERED FILM AND BAG PRODUCED THEREFROM FOR PACKAGING VEGETABLES AND FRUITS

Tsutomu Isaka, and Saburo Ohta, both of Inuyama, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Apr. 29, 1987, Ser. No. 43,959
Claims priority, application Japan, May 1, 1986, 61-101741; Jul. 8, 1986, 61-160529; Jul. 8, 1986, 61-160530
Int. Cl.[4] B32B *27/08*
U.S. Cl. 428—347 8 Claims

1. A biaxially oriented anti-fogging, multi-layered film comprising a base layer and at least one surface layer containing an anti-fogging agent, said film having a water vapour transmission of 15 to 200 g/m^2·24 hr·40° C., an oxygen permeability of 3,000 to 35,000 cc/m^2·24 hr·atm·20° C.·90% RH, and a carbon dioxide permeability of 12,000 to 130,000 cc/m^2·24 hr atm·20° C.·90% RH, said anti-fogging surface layer having heat sealing

properties such that the film shows a side welding seal strength of at least 3.0 kg-cm/15 mm when side welding seal is carried out at 270° C., and at least one surface layer of said film showing an anti-fogging property when exposed to two cycles of temperature rise and drop between 20° C. and 40° C., the temperature rises and drops occurring at 6 hour intervals.



4,876,147

CABLE INSULATION BASED ON ETHYLENE POLYMERS HAVING HIGH RESISTANCE TO THE FORMATION OF WATER TREES

Johannes Schlag; Ernst Koehnlein; Peter Bauer, all of Ludwigshafen; Ludwig Koessler, Gruenstadt, and Alfred F. Hausz, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 5, 1987, Ser. No. 22,137

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607757

Int. Cl.[4] B32B *27/28, 15/08;* **C08L** *53/02, 23/04*

U.S. Cl. 428—379 **5 Claims**

1. A cable having a cable insulation having high resistance to the formation or growth of water trees and high aging resistance and consisting of an ethylene polymer having a melt flow index of from 0.2 to 10 g/10 min and densities of from 0.890 to 0.934 g/cm 3 and from 2 to 10 percent by weight, based on the ethylene polymer, of a styrene copolymer and conventional additives selected from the group consisting of antioxidants, flameproofing agents, cross-linking assistants and cross-linking agents, wherein the styrene copolymer is a styrene/diene copolymer in which not less than 90% of the olefinic double bonds have been hydrogenated.

4,876,148

CERAMIC BODIES HAVING A PLURALITY OF STRESS ZONES

Anil V. Virkar, Salt Lake City, Utah, assignor to Ceramatec, Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 792,480, Oct. 29, 1985, Pat. No. 4,677,009, which is a continuation-in-part of Ser. No. 665,912, Oct. 29, 1984, Pat. No. 4,656,071. This application Jun. 30, 1987, Ser. No. 68,445

Int. Cl.[4] B32B *17/00;* **D02G** *3/00*

U.S. Cl. 428—384 **7 Claims**

1. A green crystalline ceramic body having at least two compositional zones comprising:

a first substantially continuous compositional layer composed of sinterable ceramic particles; and

a second substantially continuous compositional layer substantially coextensive and contiguous with said first layer wherein a substantial portion of the particles in said second layer have the same composition as those of the first layer and additionally a significant content of a ceramic fiber or whisker having a lower coefficient of thermal expansion than the sinterable particles of said first layer, thereby, upon sintering and cooling, occasioning a compressive stress in said second layer and a tensile stress in said first layer.

4,876,149

MAGNETIC RECORDING MEDIA AND A METHOD USING A STABLE FLUID REACTIVE DISPERSION IN PREPARING MAGNETIC RECORDING MEDIA

Roopram Ramharack, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 31, 1986, Ser. No. 892,248

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[4] G11B *5/70*

U.S. Cl. 428—425.9 **17 Claims**

1. A magnetic recording medium, having a magnetizable layer and selected from tapes and diskettes comprising a flexible, non-magnetic support base having two opposing major surfaces wherein said magnetizable layer or a non-magnetizable layer on at least a portion of at least one of said major surfaces is comprised of a finely divided particulate solid and a crosslinked binder mixture therefor, which crosslinked binder mixture is comprised of:

(1) at least about 5 weight percent of a hard component dispersing polymer having a degree of polymerization greater than 100 comprised of units derived from:

(i) one or more vinyl aromatic monomers and one or more ethylenically unsaturated monomers having aliphatic hydroxyl functionality, or

(ii) one or more vinyl aromatic monomers having hydroxyl functionality,

which polymer is crosslinked into said binder; and

(2) a soft-component contributing polymer which is a multihydroxyl-functional polyurethane; the weight ratio of hard-component contributing polymers to soft-component contributing polymers ranging from about 1:4 to 4:1.

4,876,150

LANGMUIR BLODGETT FILMS

Gilbert W. Smith, Worcester; Mervyn F. Daniel, Chester; John W. Barton, and Norman M. Ratcliffe, both of Bristol, England, assignors to The Secretary of State for Defence in Her Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, Sole of Whitehall, United Kingdom

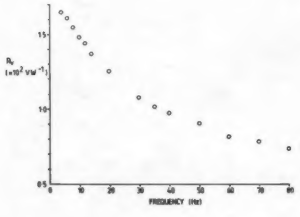
PCT No. PCT/GB86/00371, § 371 Date Apr. 20, 1987, § 102(e) Date Apr. 20, 1987, PCT Pub. No. WO87/00347, PCT Pub. Date Jan. 15, 1987

PCT Filed Jun. 25, 1986, Ser. No. 22,801

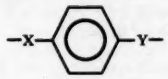
Claims priority, application United Kingdom, Jun. 28, 1985, 8516483

Int. Cl.[4] B32B *9/04*

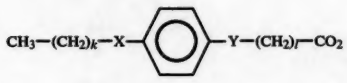
U.S. Cl. 428—411.1 **13 Claims**



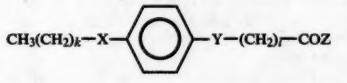
1. A Langmuir-Blodgett (LB) film of ABAB structure composed of a combination of compounds A and B which are different and which are selected from the group consisting of: AB combinations wherein A has the formula E-C-F and B has the formula E^1-C^1-F^1, wherein E and E^1 are independently $CH_3(CH^2)_i$—where i is 2–20, F and F^1 are independently —$(CH_2)_j$—COZ wherein j is 1–10 and Z is —OH, C_{1-6} alkyl or NR^1R^2 wherein R^1 and R^2 are independently H or C_{1-6} alkyl, C and C^1 are independently



where X and Y are each independently selected from the group consisting of =NH, $=NR^3$, =CO, =CH.CN, =CHONO, =CH(Halogen), —COO—, —OOC—, =CH(ONO)— CO—NH—, —CO.NR^4 and —O— where R^3 is C_{1-4} alkyl and R^4 is C_{1-6} alkyl; AB combinations wherein A is a long chain alkyl amine having the structure C_nH_{2n+1}—NH_2 where n is 16–26, and B is a long chain fatty acid having the structure R^5 $(CH_2)_m$COOH where R^5 is selected from the group consisting of CH_3 and CH_2=CH and where m is 16–26; AB combinations wherein A is a long chain alkyl amine having the structure $C_nH_{(2n+1)}$—NH_2 where n is 16–26 and B is a compound of general structure:



in which K is 2–20, l is 0 to 10, and X, Y and Z are as defined above; and AB combinations wherein A is a long chain carboxylic acid of the formula R^5 $(CH_2)_m$COOH where R^5 and m are as defined above and B is a compound of the formula:



where K, is 2–20 l, X, Y and Z are as defined above.

4,876,151

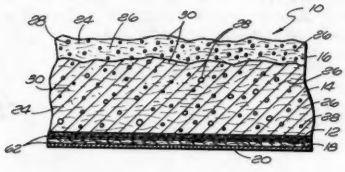
BUILDING MATERIAL AND METHOD OF PRODUCING THE BUILDING MATERIAL

Howard R. Eichen, Ventura, Calif., assignor to Treestone Corporation, Ventura, Calif.

Continuation of Ser. No. 166,966, Mar. 11, 1988, abandoned. This application Feb. 27, 1989, Ser. No. 315,543

Int. Cl.[4] B32B *13/02, 13/04*

U.S. Cl. 428—446 **51 Claims**



1. In combination in a building material,

a first layer including a cured mixture of cellulose fibers, sand and cement, each of the cellulose fibers and the sand constituting approximately twenty percent (20%) by weight in the cured mixture and the cement constituting the remainder of the mixture, and

a second layer integral with the first layer and including a cured mixture of sand, cellulose fibers and cement, the sane constituting approximately thirty five percent (35%) by weight in the mixture and the cellulose fibers constituting approximately five percent (5%) by weight in the mixture and the cement constituting the remainder of the mixture.

4,876,152

WATER-PROOFING COMPOSITION

Hyung H. Kang, Northbrook, Ill., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 28, 1988, Ser. No. 173,843

Int. Cl.[4] B32B *9/04, 13/00;* **C14C** *9/00*

U.S. Cl. 428—447 **24 Claims**

1. A composition comprising the reaction product of:

(a) a linear polysiloxane containing at least 1 percent of alkyl hydrogen siloxy groups, which polysiloxane may be represented by the following formula:

$$R'R_2SiO(R_2SiO)_x(RHSiO)_ySiR_2R',$$

wherein R is a C_1–C_5 alkyl, R' is hydrogen or R, x has an average value of from 0 to 1000, and y has an average value of from 1 to 500, and

(b) a C_7–C_{30} alkenyl succinic anhydride, the mole ratio of alkenyl succinic anhydride to alkyl hydrogen siloxy groups in the polysiloxane being such that the reaction product is substantially depleted of alkyl hydrogen siloxy groups.

24. Masonry containing a water repellent coating of the composition of claim 1.

4,876,153

PROCESS FOR THE PREPARATION OF CYANATE RESIN-BASED PREPREGS AND FILMS WHICH MAINTAIN THEIR TACK

Bradley S. Thorfinnson, Orange, Calif., assignor to BASF Corporation, Parsippany, N.J.

Continuation-in-part of Ser. No. 36,781, Apr. 9, 1987, abandoned. This application Feb. 29, 1988, Ser. No. 161,753

Int. Cl.[4] B32B *9/04;* **D04H** *1/00;* **D03D** *15/00;* **C09J** *7/02*

U.S. Cl. 428—447 **28 Claims**

1. A multiple layer composition comprising:

(a) a first layer of heat-curable resin which comprises a cyanate-functional resin;

(b) at least a second layer which is a silicone coated release film removably adherent to said cyanate-functional resin layer;

wherein said silicone coating contains an amount of residual metal catalyst which is effective to cause no greater than a 2.5-fold increase in said heat-curable resin viscosity after storage of said composition at room temperature for one week.

4,876,154

COMPOSITE WOOD STRUCTURES BONDED BY POLY(VINYL ACETATE) EMULSION ADHESIVES CONTAINING AN ALKOXYSILANE

Gerald L. Witucki, and Edwin P. Plueddemann, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 125,438, Nov. 25, 1988, Pat. No. 4,818,779. This application Sep. 26, 1988, Ser. No. 249,061

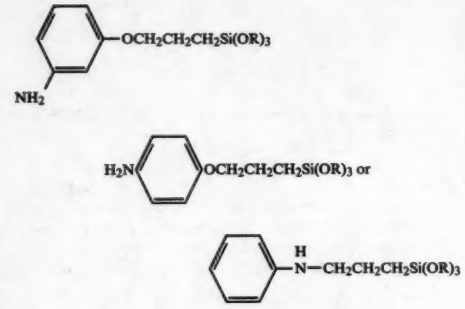
Int. Cl.[4] B32B *9/04*

U.S. Cl. 428—447 **13 Claims**

1. A composite wood structure bonded by a composition comprising:

(i) a water-borne emulsion adhesive based on a poly(vinyl acetate) resin; and

(ii) an adhesion promoter consisting essentially of at least one alkoxysilane selected from



in which R is independently selected from alkyl or alkoxyalkyl radicals having 1–4 carbon atoms, and from about 1 to 80% by weight of a plasticizer for said poly(vinyl acetate) resin, wherein said alkoxysilane constitutes from about 0.5 to 5.0 percent by weight of said composition.

4,876,155

POLYESTER FILM

Klaus Thoese, and Karl-Heinz Jung, both of Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Dec. 15, 1987, Ser. No. 133,486

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 3642848

Int. Cl.[4] B32B *27/08, 27/36*

U.S. Cl. 428—480 **13 Claims**

1. A biaxially stretch-oriented and heat-set polyester film having, on at least one surface, a coating comprising a copolyester, containing sulfonate groups, wherein said coating further comprises an antistatically effective amount of at least one salt derived from an amino acid or a protein hydrolysate.

4,876,156

FILM AND SHEET CAPABLE OF FORMING RETORTABLE AND EASY-OPEN PACKAGINGS

Charles C. Hwo, Sugarland, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 49,903, May 15, 1987. This application Dec. 16, 1988, Ser. No. 285,567

Int. Cl.[4] B32B *27/08*

U.S. Cl. 428—516 **4 Claims**

1. A laminar structure comprising a polypropylene substrate to which is bonded by extrusion lamination a film or sheet which is capable of forming peel seals, comprising a mixture containing:

from about 5 percent by weight to about 25 percent by weight of an ethylenic homopolymer or copolymer selected from the group consisting of linear low density polyethylene (LLDPE), low density polyethylene (LDPE), medium density polyethylene (MDPE), ethylene vinyl acetate copolymer (EVA), ethylene-methyl acrylate copolymer (EMA), ethylene-ethyl acrylate copolymer (EEA), ethylene-butyl acrylate copolymer (EBA), and high density polyethylene (HDPE);

from about 50 percent by weight to about 75 percent by weight of the butene-1 homopolymer or copolymer; and

from about 25 percent by weight to about 45 percent by weight of propylene homopolymer or copolymer.

4,876,157

PROCESS FOR PRODUCING A TOOTHBRUSH AND A TOOTHBRUSH BLANK FOR USE IN THE PROCESS

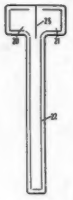
Rolf Barman, Olav Kyrresgt.45, N-5000 Bergen, Norway

PCT No. PCT/NO86/00037, § 371 Date Jan. 25, 1988, § 102(e) Date Jan. 25, 1988, PCT Pub. No. WO87/07123, PCT Pub. Date Dec. 3, 1987

PCT Filed May 30, 1986, Ser. No. 153,821

Int. Cl.[4] B29B *7/00*; A46B *9/04*

U.S. Cl. 428—542.8 **6 Claims**



1. A toothbrush blank comprising

a handle;

a pair of head portions integrally mounted on said handle;

a narrowed hinge-forming transition portion having a V-shaped cavity on one side between said head portions to permit bending of said head portions into angular relation to each other; and

a plurality of rows of bores in said one side for receiving bristles in each head portion.

4,876,158

PISTON RING HAVING A WEAR RESISTANT SURFACE LAYER

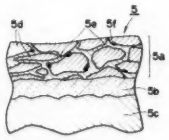
Toru Onuki; Junichi Sagawa; Tamotsu Watanabe, all of Kashiwazaki, and Toshio Yoshimitsu, Oyama, all of Japan, assignors to Kabushikikaisha Riken and Kabushiki Kaisha Komatsu Seisakusho, both of Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 169,706

Claims priority, application Japan, Mar. 20, 1987, 62-66795

Int. Cl.[4] B22F *5/02*

U.S. Cl. 428—565 **2 Claims**



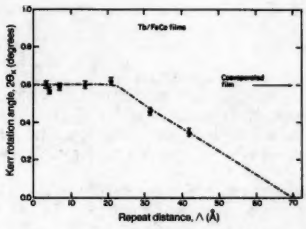
1. A piston ring having a wear resistant surface layer consisting essentially of 40 to 70 wt. % cobalt or cobalt base alloy as a binder, and the balance being substantially a powder of dichromium trioxide (Cr_2O_3).

4,876,159

MAGNETROOPTICAL RECORDING MEDIA AND METHOD OF PREPARING THEM

Sung-Chul Shin, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 14, 1988, Ser. No. 168,104
Int. Cl.[4] B32B 5/00
U.S. Cl. 428—607 11 Claims



1. A method for producing magnetooptical recording media which comprises evaporating a rare earth metal and a transition metal and sequentially depositing the rare earth and transition metals on a substrate at a maximum repeat distance of 21 angstroms to form a nonhomogeneous, non-layered mixed film.

4,876,160

ORGANIC COMPOSITE-PLATED STEEL SHEET

Yoshio Shindou; Motoo Kabeya; Takashi Shimazu, and Fumio Yamazaki, all of Kimitsu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,070
Int. Cl.[4] B32B 15/08
U.S. Cl. 428—623 12 Claims

1. A steel sheet having an organic composite plating layer which comprises a steel sheet plated with zinc, aluminum or zinc base composite alloy as a substrate, a first layer of insoluble chromate film of 5% or less in content of water-soluble matter formed on the surface of said substrate at a coverage of 10–150 mg/m^2 in terms of total chromium content and a second layer from a coating composition having the following composition coated at a thickness of 0.3–5 μm as a solid content film on said first layer:

(A) a bisphenol type epoxy resin having terminal epoxy groups and having a number-average molecular weight of 300–100,000 in an amount of 30% by weight or more based on solid content in the coating composition,

(B) at least one curing agent selected from the group consisting of a polyisocyanate compound and a block polyisocyanate compound at a weight ratio to solid content in the epoxy resin of 1/10–20/10,

(C) fumed silica having an average particle size of 0.1–100 mμ in an amount of 5–50% by weight based on solid content in the coating composition, and

(D) a ketone organic solvent in an amount of 40% by weight or more of the coating composition, and

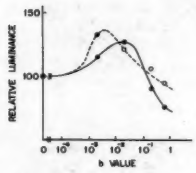
the solid content in the coating composition being 10–50% by weight.

4,876,161

PHOSPHOR AND RADIATION IMAGE STORAGE PANEL

Kenji Takahashi; Takashi Nakamura, and Yuichi Hosoi, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 47,594, May 11, 1987, abandoned, which is a continuation of Ser. No. 727,972, Apr. 26, 1985, abandoned. This application Sep. 2, 1988, Ser. No. 240,457
Claims priority, application Japan, Apr. 26, 1984, 59-84358; Apr. 26, 1984, 59-84359
Int. Cl.[4] C09K 11/61
U.S. Cl. 428—691 13 Claims



7. A divalent europium activated alkaline earth metal halide phosphor having the formula (I):

$$M^{II}X_2.aM^{II}X'_2.bP_2O_5:xEu^{2+}$$

in which M^{II} is at least one alkaline earth metal selected from the group consisting of Ba, Sr and Ca; each of X and X' is at least one halogen selected from the group consisting of Cl, Br and I, and $X \neq X'$; and a, b and x are numbers satisfying the conditions of $0.1 \leqq a \leqq 10.0$, $2 \times 10^{-3} \leqq b \leqq 5 \times 10^{-2}$ and $0 < x \leqq 0.2$, respectively.

8. A divalent europium activated alkaline earth metal halide phosphor having the formula (II):

$$M^{II}X_2.aM^{II}X'_2.bSiO_2:xEu^{2+}$$

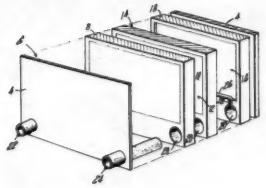
in which M^{II} is at least one alkaline earth metal selected from the group consisting of Ba, Sr and Ca; each of X and X' is at least one halogen selected from the group consisting of Cl, Br and I, and $X \neq X'$; and a, b and x are numbers satisfying the conditions of $0.1 \leqq a \leqq 10.0$, $10^{-4} \leqq b \leqq 2 \times 10^{-1}$ and $0 < x \leqq 0.2$, respectively.

4,876,162

FUEL CELL WITH INTEGRAL CONDUIT MEANS FOR STATICALLY REMOVING LIQUID PRODUCT WATER

McElroy James F., Suffield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 176,520, Apr. 1, 1988, abandoned. This application Sep. 12, 1988, Ser. No. 244,533
Int. Cl.[4] H01M 8/04
U.S. Cl. 429—13 5 Claims



1. A fuel cell comprising an anode, an electrolyte, a cathode, a cathode chamber and a means for removing static product water from the cathode chamber characterized in that the means for static product water removal comprises a wick

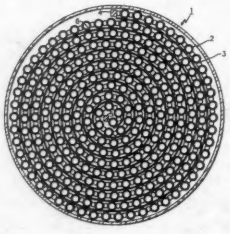
positioned at the base of and extending at least substantially the entire length of the cathode chamber, said wick being in contact with at least one exhaust manifold structure exiting the cathode chamber wherein said manifold structure contains a conduit structure which is permeable to liquid but impermeable to gas at gas pressures below the "bubble pressure, P" of the conduit structure where the "bubble pressure, P" is related to the pore size of the structure by the relationship

$$P = \frac{2\ (\text{surface tension})}{(\text{pore radius for nominally circular pores})}$$

4,876,163
GENERATOR CONFIGURATION FOR SOLID OXIDE FUEL CELLS

Philip Reichner, Plum Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 18, 1987, Ser. No. 135,190
Int. Cl.[4] H01M *8/10*
U.S. Cl. 429—30 **28 Claims**

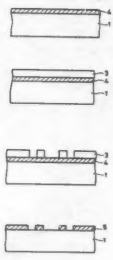


1. In a solid oxide fuel cell generator having a multiplicity of electrically connected solid oxide fuel cells, where a fuel gas is passed over one side of said cells and a gaseous source of oxygen is passed over the other side of said cells, whereby said fuel is consumed and heat and electricity are generated, the improvement which comprises said cells being disposed in the configuration of a spiral.

4,876,164
PROCESS FOR MANUFACTURING A PHOTOMASK

Yaichiro Watakabe; Tatsuo Okamoto, and Shuichi Matsuda, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 819,102, Jan. 15, 1986, abandoned. This application Jul. 17, 1987, Ser. No. 75,297
Claims priority, application Japan, Jan. 28, 1985, 60-16203
Int. Cl.[4] G03F *1/00*
U.S. Cl. 430—5 **7 Claims**



1. A process for manufacturing a photomask comprising the steps of:

preparing a substantially transparent glass substrate;

forming a metal silicide film opaque to visible light on said transparent glass substrate, said metal silicide film being selected from the group consisting of one of a silicide film of molybdenum and tungsten;

applying a resist on said metal silicide film;

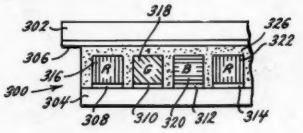
providing a mask pattern by light or electron beam, followed by a developing process;

etching away at least an exposed portion of said metal silicide film by means of a dry etching process.

4,876,165
LIGHT FILTERS FOR MICROELECTRONICS

Terry L. Brewer, Rolla; Dan W. Hawley, St. James; James E. Lamb; William J. Latham, both of Rolla, and Lynn K. Stichnote, Cuba, all of Mo., assignors to Brewer Science, Inc., Rolla, Mo.

Continuation-in-part of Ser. No. 431,798, Sep. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 638,258, Aug. 6, 1984, which is a continuation-in-part of Ser. No. 825,855, Feb. 4, 1986, Pat. No. 4,822,718. This application Jan. 12, 1987, Ser. No. 2,107
Int. Cl.[4] G03F *7/26*
U.S. Cl. 430—7 **15 Claims**



1. In a process of making microelectronic color filter elements by microphotolithography, the improvement comprising, applying a layer of a substantially non-particulate filter coating material to a filter substrate, the filter coating material including a vehicle and a soluble dye incorporation therein, the soluble dye being heat stable and in combination with the vehicle being effective to produce a high color resolution, applying a photoresist to the layer of the filter coating material on the filter substrate, photographically imaging and developing the photoresist, the filter coating material imaging and developing with the photoresist, curing the color element to substantially insolubilize the color element, the cured filter element containing the stable dye being effective to consistently transmit and resolve colored light, the cured filter element containing the stable dye having a high electrical resistivity and a high dielectric strength.

4,876,166
COLOR FILTER ARRAY

Ronald W. Wake, Hilton; Sibylle L. Reithel, Ontario, and Hugh G. McGuckin, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 19, 1988, Ser. No. 195,917
Int. Cl.[4] G03C *1/71, 7/10*
U.S. Cl. 430—7 **4 Claims**

1. A color filter array comprising:

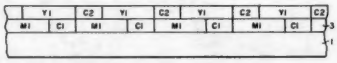
a first layer having a first mordant of a first polarity and a color dye of a second, opposite polarity, and

a second layer having a second mordant of a second polarity and a color dye of the first polarity to thereby prevent cross-dyeing.

4,876,167
COLOR FILTER ARRAY CONTAINING A PHOTOCROSSLINKED POLYMERIC MORDANT

Robert A. Snow, Pittsford; Hugh G. McGuckin, Rochester; Ignazio S. Ponticello, Pittsford; Robert C. Daly, Rochester; Laurel J. Pace, Rochester; Sandra K. Fischer, Rochester, and Michael J. Hanrahan, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 20, 1987, Ser. No. 87,486
Int. Cl.[4] G03C 7/12, 1/71
U.S. Cl. 430—7 16 Claims



1. A color filter array comprised of interlaid sets of laterally displaced first, second, and third additive primary filters, characterized in that

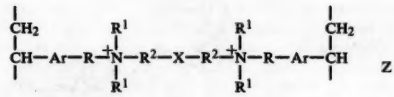
said sets of filters are comprised of two discrete bottom layers, one bottom layer containing a first subtractive primary dye forming a bottom layer of said first and second filters and a second bottom layer containing a second subtractive primary dye forming a bottom layer of said third filters and

said sets of filters being formed of two discrete overlying layers, one overlying layer containing said second subtractive primary dye forming an overlying layer of said first filters and a second overlying layer containing a third subtractive primary dye forming an overlying layer of said second and third filters,

at least one of said bottom and overlying layers being of controlled thickness and containing

a single subtractive primary anionic dye and

a cationic vinyl polymer mordant containing crosslinking repeating units of the formula:



wherein, independently in each occurrence,

Ar is an aromatic linking group,

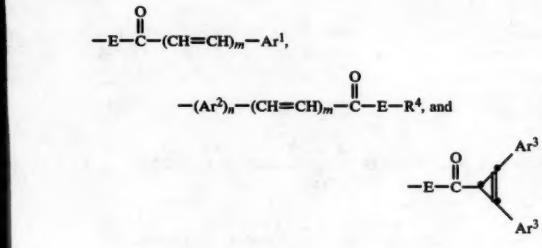
R is a methylene group,

R^1 is a lower alkyl group,

R^2 is a divalent linking group,

X is a [1,3-cyclobutylene] crosslinking group photogenerated by the addition reaction of two X^1 groups,

X^1 is chosen from the group consisting of



Ar^1 is an aromatic moiety;

Ar^2 is a divalent aromatic moiety;

E is an oxy or imino moiety;

m is 1 or 2;

n is 0 or 1;

R^4 is a terminal hydrocarbon group; and

Z represents one or more charge balancing counter ions.

4,876,168
PHOTOSENSITIVE MEMBER COMPRISING CHARGE GENERATING LAYER AND CHARGE TRANSPORTING LAYER COMPRISING AMORPHOUS CARBON CONTAINING CHALOGEN OR TRANSITION METAL

Hideo Hotomi; Izumi Osawa; Syuji Iino; Isao Doi, and Masanori Fujiwara, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 24, 1988, Ser. No. 210,788
Claims priority, application Japan, Jun. 26, 1987, 62-159953; Jun. 26, 1987, 62-159954
Int. Cl.[4] G03G 5/085
U.S. Cl. 430—58 3 Claims

1. A photosensitive member comprising:

an electrically conductive substrate;

a charge generating layer; and

a charge transporting layer comprising amorphous carbon containing hydrogen in an amount in an amount of about 0.1 to about 67 atomic % based on the combined amount of hydrogen and carbon, said charge transporting layer containing about 0.1 to about 10 atomic % of chalcogen atoms or transition metal elements based on all the consistuent atoms in the layer.

4,876,169
TONER COMPOSITIONS WITH RELEASE ADDITIVES THEREIN

Robert J. Gruber, Pittsford, N.Y.; Raymond A. Yourd, III, Cleveland Heights, Ohio; Shadi L. Malhotra, Mississauga, Canada; Robert A. Nelson, Webster, N.Y.; Carol A. Fox, Fairport, N.Y., and Thomas R. Hoffend, Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 24, 1988, Ser. No. 261,661
Int. Cl.[4] G03G 9/08
U.S. Cl. 430—110 31 Claims

1. A toner composition for utilization in electrophotographic imaging systems wherein release management devices are avoided, which compositions are comprised of pigment particles and resin particles comprised of a polyester with siloxane block segments therein, which polyester has incorporated therein silicone release fluid additives.

4,876,170
LIGHT-SENSITIVE MATERIAL COMPRISING LIGHT-SENSITIVE LAYER CONTAINING MICROCAPSULES PROVIDED ON SPECIFIC PAPER SUPPORT

Shigehisa Tamagawa, Shizuoka; Masayuki Kuroishi, Kanagawa, and Tetsuro Fuchizawa, Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 22, 1987, Ser. No. 136,575
Claims priority, application Japan, Dec. 22, 1986, 61-307206; Apr. 6, 1987, 62-84113
Int. Cl.[4] G03C 1/87, 1/72
U.S. Cl. 430—138 22 Claims

1. A light-sensitive material comprising a light-sensitive layer containing silver halide, a reducing agent and an ethylenically unsaturated polymerizable compound provided on a paper support, wherein the paper support employs a base paper sheet having:

such a distribution of formation that the total coefficient of variation relating to the distribution curve of laser beam transmittance is not more than 15%, said distribution curve of laser beam transmittance being obtained by helium-neon laser scanning;

such a distribution of fiber length that the amount of residual pulp on 24 mesh screen and on 42 mesh screen is in the

range of 30 to 60 weight % based on the total amount of the pulp contained in the base paper sheet; and

a density in the range of 0.85 to 1.10 g/m^2.

4,876,171

SILVER SALT DIFFUSION TRANSFER WITH COMPLEXING COMPOUND

Hiroyuki Hirai, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 12, 1988, Ser. No. 155,470

Claims priority, application Japan, Feb. 13, 1987, 62-31184

Int. Cl.[4] G03C *5/54*

U.S. Cl. 430—203 13 Claims

1. A method for forming an image, comprising imagewise exposing a silver halide photosensitive material and subjecting a photographic material comprising said silver halide photosensitive material and an image-receiving material to a silver salt diffusion transfer process in the presence of a reducing agent, a physical developement nucleus, and a complexing compound capable of complexing reaction with a silver ion in the presence of water and/or a hydrophilic thermal solvent as a medium wherein said complexing compound is selected from aromatic heterocyclic compounds having at least one —COOM and containing one nitrogen atom in their ring wherein M is selected from the class consisting of an alkali metal, a guanidine, an amidine, and quaternary ammonium.

13. The image forming method of claim 1 which further comprises heating the photographic material during the silver salt diffusion transfer process.

4,876,172

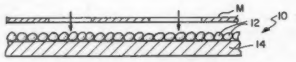
IMAGING METHOD EMPLOYING PHOTOADHESIVE MICROPARTICLES

Gary F. Hillenbrand, Springboro, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed May 20, 1987, Ser. No. 52,520

Int. Cl.[4] G03C *1/46, 1/72, 5/40*

U.S. Cl. 430—253 12 Claims



1. A process for forming images which comprises:

(a) forming a continuous layer of photosensitive microparticles, said microparticles being formed from a material which becomes tacky upon exposure to actinic radiation,

(b) image-wise exposing said layer to actinic radiation such that said microparticle become tacky in the exposed areas,

(c) assembling said layer with a receiver sheet, and

(d) transferring said microparticles to said receiver sheet in the exposed areas.

4,876,173

PHOTOPOLYMERIZABLE COMPOSITION ON POLYETHYLENE TEREPHTHALATE FILM SUPPORT

Kazuo Maemoto, Kanagawa; Masayuki Iwasaki; Minoru Maeda, both of Shizuoka, and Yoshimasa Aotani, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

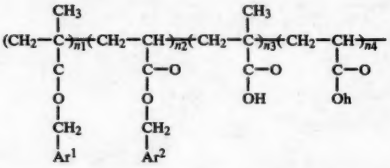
Continuation of Ser. No. 42,550, Apr. 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 824,343, Jan. 23, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 240,455

Claims priority, application Japan, Jan. 23, 1985, 60-10271

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—271 14 Claims

1. A photopolymerizable photoresist composition in the form of a sheet or roll on a transparent polyethylene terephthalate releasable film support, consisting essentially of (A) an addition polymerizable unsaturated compound having at least two ethylenically unsaturated double bonds per molecule in an amount of from 7.5 to 55% by weight, (B), a photopolymerization initiator in an amount of from 0.1 to 10% by weight, and (C) a binder in an amount of 20 to 80% by weight, wherein said binder consists essentially of a copolymer represented by formula (I)



wherein Ar^1 and Ar^2 each represent a substituted or unsubstituted phenyl group; and n_1, n_2, n_3, and n_4 each represents a mol % of the respective repeating units set forth in formula (I), wherein n_1 is from 0 to about 70; n_2 is from 0 to about 70; n_3 is from about 5 to 50; and n_4 is from about 5 to 50; provided that n_1 and n_2 are not 0 at the same time, the sum of n_1 and n_2 is from about 20 to 70, the sum of n_3 and n_4 is from about 30 to 80, wherein said copolymer has a weight average molecular weight of from 10,000 to 500,000.

4,876,174

METHOD OF PROCESSING SILVER HALIDE COLOR PHOTOSENSITIVE MATERIAL USING DEVELOPER COMPRISING DIALKYL HYDROXYLAMINE AND NO BENZYL ALCOHOL

Takatoshi Ishikawa, and Morio Yagihara, both of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Jun. 18, 1987, Ser. No. 63,469

Claims priority, application Japan, Jun. 24, 1986, 61-147822

Int. Cl.[4] G03C *7/30*

U.S. Cl. 430—380 15 Claims

1. A method of processing a silver halide color photosensitive material comprising, processing an exposed silver halide color photosensitive material having at least one emulsion layer containing a silver halide having a chlorine content of at least 80 molar % based on the total halogens with a color developer which is substantially free of benzyl alcohol, said color developer (i) having a pH of about 9 to about 11, (ii) containing sulfites in an amount ranging from about 0 to about 5 g/l, (iii) containing an aromatic primary amine color developing agent, and (iv) containing a dialkylhydroxylamine of the following general formula (I):

(I)

wherein R^1 and R^2 each represent an unsubstituted or substituted alkyl group or an unsubstituted or substituted alkenyl group or R^1 and R^2 may form a hetero ring together with nitrogen atom.

4,876,175

DYE SENSITIZED PHOTOGRAPHIC IMAGING SYSTEMS

Chin H. Chen, Fairport, N.Y.; John L. Fox, Baltimore, Md.; Donald P. Specht, and Samir Y. Farid, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 9, 1988, Ser. No. 191,947

Int. Cl.[4] G03C *1/72*

U.S. Cl. 430—281 26 Claims

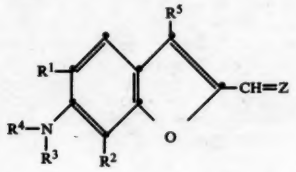
1. A photographic imaging system comprised of

a hardenable organic component containing ethylenic unsaturation sites and

coinitators for ethylenic addition comprised of

an activator and,

a photosensitizer which satisfies the formula:



where

Z represents the atoms providing an electron withdrawing —C(O)— or —SO_2— group;

R^1, R^2, and R^5 each independently represent hydrogen, alkyl, or aryl;

R^3 and R^4 each independently represent alkyl; or

at least one of the substituent pairs represented by R^1 and R^4, R^2 and R^3, and R^3 and R_4 complete a 5 or 6 membered ring.

4,876,176

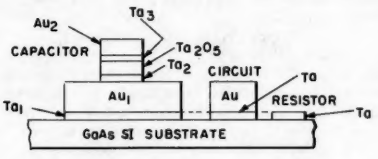
METHOD FOR FABRICATING QUASI-MONOLITHIC INTEGRATED CIRCUITS

Joseph A. Calviello, Kings Park; Paul R. Bie, Commack, and Ronald J. Pomian, Dix Hills, all of N.Y., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 20, 1987, Ser. No. 40,416

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—311 **9 Claims**



1. A method for producing a quasi-monolithic integrated circuit comprising the steps of:

(a) enclosing a substrate in an environmentally isolated chamber;

(b) producing over a substantial portion of a surface of the substrate at least five superimposed layers of metals and oxides, wherein said metals include at least one from the group tantalum, molybdenum, tungsten, and gold, and wherein said oxides include at least one from the group of oxides of tantalum, molybdenum, and tungsten;

(c) removing the circuit from said chamber;

(d) sequentially processing patterned areas of said layers substantially from the exposed top layer downward, to define and produce circuit elements forming a partially complete integrated circuit, by processes including photolithography; and

(e) bonding active circuit elements to the partial circuit to complete the fabrication of the quasi-monolithic circuit.

4,876,177

PROCESS FOR PRODUCING PRINTED CIRCUIT BOARD

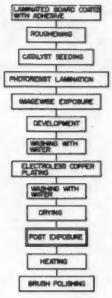
Haruo Akahoshi, Hitachi; Kanji Murakami, Mito; Mineo Kawamoto; Akio Tadokoro, both of Hitachi, and Toyofusa Yoshimura, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 8, 1987, Ser. No. 95,921

Claims priority, application Japan, Sep. 5, 1986, 61-207788

Int. Cl.[4] B05D *5/12*; G03L *5/00*

U.S. Cl. 430—313 **34 Claims**



1. A process for producing a printed circuit board, which comprises the steps of:

forming a layer comprising a photosensitive resin composition on an insulating substrate having on its surface an adhesive layer adherent to a metal being subsequently plated thereon;

exposing said layer comprising a photosensitive resin composition to an actinic radiation in a manner so as to form on said layer a negative pattern of a conductor circuit pattern and to semicure said negative pattern to an extent sufficient to keep it from erosion by a plating solution;

developing by dissolving away with a solvent the uncured areas not exposed to said actinic radiation, thereby to form a plating resist from the semicured areas of said negative pattern;

chemically plating said conductor circuit pattern areas not covered with said plating resist, thereby to form a conductor circuit; and

carrying out a curing treatment to cure completely said plating resist by exposing to actinic radiation.

4,876,178

ELECTROCONDUCTIVE FILM SYSTEM FOR AIRCRAFT WINDOWS

David L. Voss, Van Nuys; Howard S. DeCamp, Northridge, and Gordon W. Culp, Van Nuys, all of Calif., assignors to Sierracin Corporation, Sylmar, Calif.

Continuation of Ser. No. 904,033, Sep. 4, 1986, abandoned, which is a division of Ser. No. 529,975, Sep. 7, 1983, Pat. No. 4,707,586, which is a continuation-in-part of Ser. No. 262,494, May 11, 1981, abandoned. This application Sep. 30, 1988, Ser. No. 253,377

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—314 **40 Claims**

1. A method for forming a plurality of spaced apart electroconductive metal film runs on the surface of a transparent substrate, the method comprising the steps of:

(a) forming a transparent polymer basecoat on a surface of a transparent substrate;

(b) depositing a quantity of electroconductive metal onto the transparent polymer basecoat surface to thereby form a metal strike coat;

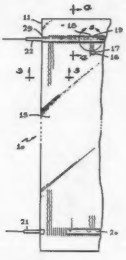
(c) masking a portion of the metal strike coat so that un-

masked portions of the strike coat comprise the pattern of the electroconductive metal film runs being formed;

(d) electroplating an electroconductive metal onto the unmasked portions of the metal strike coat; and

(e) removing the portions of the metal strike coat onto which no metal was electroplated to thereby leave a plurality of spaced apart electroconductive metal film runs on the surface of the substrate, the metal film runs comprising electroplated metal and the portion of the metal strike coat beneath the electroplated metal.

7. The method according to claim 1 wherein step (c) comprises:



(a) applying a positive photoresist over the metal strike coat;

(b) removably applying a patterned photomask over the photoresist; the cut-out portion of the pattern comprising the pattern of the electroconductive metal film runs being formed;

(c) exposing the portions of the photoresist left uncovered by the pattern to ultraviolet light to thereby develop the exposed photoresist.

(d) removing the developed photoresist to unmask portions of the metal strike coat wherein the unmasked portions comprise the pattern of the electroconductive metal film runs being formed.

4,876,179

METHOD FOR MANUFACTURING CERAMIC MATERIAL HAVING PIEZO-ELECTRIC PROPERTIES

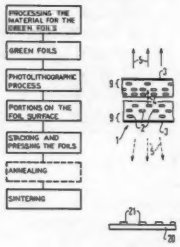
Ulrich Bast, Munich, and Wolfram Wersing, Kirchheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 10, 1987, Ser. No. 60,168

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1986, 3619871

Int. Cl.[4] G03C *5/40*

U.S. Cl. 430—320 **14 Claims**



1. A method for the manufacture of ceramic material for ultrasound transducers having piezo-electric properties and a pre-defined arrangement of internal cavities which comprises:

forming thin green foils of said ceramic material,

coating a surface of each foil with a layer of a photosensitive material,

exposing and developing said photo-sensitive material to leave a pattern of exposed photo-sensitive material thereon of a predetermined size and shape,

stacking up a plurality of the foils, and

pressing and sintering the stacked foils to produce a ceramic body having said pre-defined pattern of internal cavities contained therein and a predetermine porosity, said foils being heated to sintering temperature by first heating the same up to a temperature in the range of about 300° to 400° . in a non-oxidizing atmosphere and then heating up to sintering temperature in an atmosphere of oxygen.

4,876,180

METHOD OF AND APPARATUS FOR PROCESSING SILVER HALIDE-CONTAINING PHOTOSENSITIVE MATERIAL FOR COLOR PHOTOGRAPHY

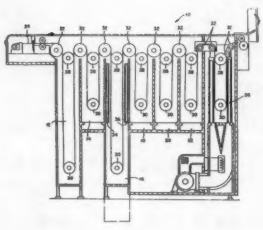
Akira Abe; Junya Nakajima; Haruo Takase; Kazushige Uenaka, and Ruyzi Otomo, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 12,461, Feb. 9, 1987. This application Jul. 12, 1988, Ser. No. 217,995

Claims priority, application Japan, Feb. 7, 1986, 61-25173

Int. Cl.[4] C03C *7/00, 5/38, 5/24, 5/44*

U.S. Cl. 430—393 **6 Claims**



1. An apparatus for processing a silver halide-containing photosensitive material for color photography, comprising:

a bleaching bath tank;

a bleach-fixing bath tank provided downstream of said bleaching bath tank; and

bath solution jetting means for jetting bleaching-fixing solution to bring a stream of bleaching-fixing solution in contact with the emulsion coating surface of said photosensitive material in said bleaching-fixing bath tank at a flow velocity which is greater than the flow velocity of bleaching-fixing solution which is circulated in said bleach-fixing bath tank whereby the rate of silver removal of said photosensitive material is increased.

4,876,181

PHOTOGRAPHIC ELEMENTS CONTAINING INFRARED FILTER DYES

Gary S. Proehl; Anthony D. Gingello, both of Rochester; David J. Collett, Walworth; Richard L. Parton, Webster; David A. Stegman, Churchville, and Anthony Adin, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 41,954, Apr. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 881,312, Jul. 2, 1986, abandoned. This application Mar. 10, 1988, Ser. No. 166,135

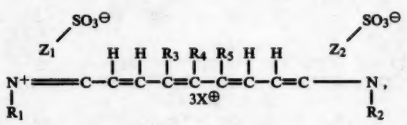
Int. Cl.[4] G03L *1/84*

U.S. Cl. 430—522 **8 Claims**

1. A photographic element comprising a support having thereon a hydrophilic colloid layer comprising infrared-sensitive silver halide and a hydrophilic colloid layer, which is the

same as or different from said silver halide layer, comprising an amount effective as a photographic filter dye of a compound having the formula:

(I)



wherein:

R_1 and R_2 each independently represents sulfoalkyl carboxyalkyl, or sulfatoalkyl containing from 3 to 6 carbon atoms, having at least 3 carbon atoms in the alkyl chain between the nitrogen atom of each Z ring and the sulfo or sulfato group, and at least 2 carbon atoms in the alkyl chain between the nitrogen of each Z ring and the carboxy group,

R_3 and R_5 are each hydrogen or together represent the atoms necessary to complete a 5- or 6-membered carbocyclic ring,

R_4 represents hydrogen, alkyl of 1 to 4 carbon atoms, aryl, cyano, halogen, or

where R_6 and R_7 each independentlly represents alkyl of from 1 to 6 carbon atoms or aryl or together represent the non-metallic atoms necessary to form a 5- or 6-membered heterocyclic ring,

$X^{\oplus}$ represents a cation, and

Z_1 and Z_2 each independently represents the atoms that complete an indole, naphthindole or benzindole nucleus.

4,876,182

PHOTOGRAPHIC ELEMENTS CONTAINING PYRAZOLONE COLOR COUPLERS

Paul R. Buckland, Marshalswick, Great Britain, assignor to Eastman Kodak COmpany, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,098

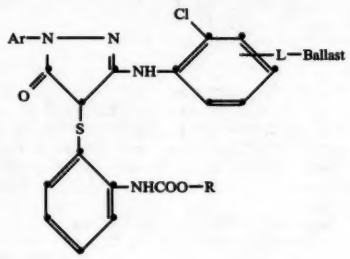
Claims priority, application United Kingdom, Jun. 21, 1988, 8814676

Int. Cl.[4] G03C *7/38*

U.S. Cl. 430—555 **5 Claims**

1. A photographic element comprising a support and a photosensitive silver halide emulsion layer which has associated therewith a dye-forming coupler compound having the structural formula:

(I)



wherein:

Ar is a substituted or unsubstituted aryl group;

R is a substituted or unsubstituted alkyl or aryl group;

L is a direct or a linking group; and

Ballast is a group of such size and configuration as to render the coupler non-diffusible in photographic coatings.

4,876,183

TUBULAR SILVER HALIDE PHOTOSENSITIVE MATERIALS SENSITIZED WITH A LUMINOUS DYE

Tsutomu Miyasaka; Masaki Okazaki, and Tadao Sugimoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 1, 1987, Ser. No. 127,139

Claims priority, application Japan, Dec. 1, 1986, 61-284272

Int. Cl.[4] G03C *1/12, 1/28*

U.S. Cl. 430—567 **16 Claims**

1. A silver halide photosensitive material comprising a support having thereon at least one silver halide emulsion layer comprising tabular grains whose diameter of an average projected area/average thickness ratio is 5/1 or higher, wherein said emulsion layer contains one or more luminescent dyes which absorb visible radiation and emit visible light whose luminescence quantum yield is 0.3 or more than the dye concentration in dry gelatin is 10^{-4} mol/dm^3 at room temperature and that can be substantially removed by development processing, and the content of said luminescent dye is 0.3 μmol/m^2 or more of the total surface area of the silver halide grains in said emulsion layer, or is 2.0 mmol/dm^3 or more in a hydrophilic dispersion medium excluding the silver halide grain surfaces in said emulsion layer and wherein said dye is substantially non-adsorbable, and the amount of adsorption of said luminescent dye is a 5 wt. % aqueous gelatin containing silver bromide whose outer surface comprises {111}planes is 5×10^{-7} mol/m^2 or less at 40° C. and a pH of 6.5±0.05 under a solution phase dye concentration of 10^{-4} mol/liter.

4,876,184

HEAT-DEVELOPABLE LIGHT-SENSITIVE MATERIAL

Hiroyuki Ozaki, and Ken Kawata, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 7, 1988, Ser. No. 165,059

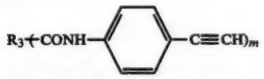
Claims priority, application Japan, Mar. 6, 1987, 62-50373

Int. Cl.[4] G03C *1/34*

U.S. Cl. 430—607 **7 Claims**

1. A heat-developable light-sensitive material comprising at least one light-sensitive silver halide emulsion layer provided on a support, wherein said material further contains an acetylene compound represented by the general formula (II):

(II)

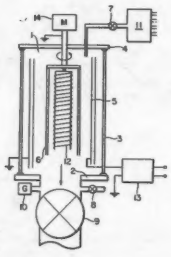


wherein m is 1 or 2; when m is 1, then R_3 is an alkyl group containing 3 or more carbon atoms or a cycloalkyl group containing 3 or more carbon atoms, each of which may be substituted; and when m is 2, then R_3 is an alkylene group, an arylene group, or a cycloalkylene group, each of which may be substituted.

4,876,185
ALUMINUM SUPPORT FOR A PHOTOCONDUCTIVE MEMBER

Yasuyuki Matsumoto, Toride; Keiichi Murai, Kashiwa; Tadaji Fukuda, Yokohama, and Kyosuke Ogawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 873,444, Jun. 6, 1986, Pat. No. 4,702,981, which is a continuation of Ser. No. 599,522, Apr. 12, 1984, abandoned. This application Jul. 9, 1987, Ser. No. 71,648
Claims priority, application Japan, Apr. 18, 1983, 58-67029
Int. Cl.[4] B21H *1/18;* B32B *15/20*
U.S. Cl. 430—580 3 Claims

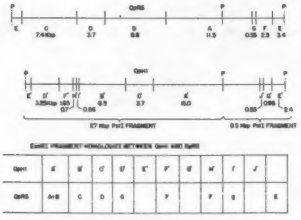


1. In an electrophotographic support for a hydrogenated and/or halogenated amorphous silicon member, which support is mirror-finished employing a cutting tool, said support being subject to generation of failures on the surface thereof due to cutting resistance caused by the presence of hard spots therein, the improvement which comprises an aluminum allow with a Fe content of 2000 ppm by weight or less, said support being a cylinder having reduced numbers of hard spots and enhanced resistance to surface defects upon mirror-finish.

4,876,186
DETECTION AND DIFFERENTIATION OF COXIELLA BURNETII IN BIOLOGICAL FLUIDS

Marvin E. Frazier, Richland, Wash.; Louis P. Mallavia, Moscow, Id.; Oswald G. Baca, Albuquerque, N. Mex., and James E. Samuel, Pullman, Wash., assignors to Battelle Development Corporation, Columbus, Ohio

Filed Nov. 5, 1985, Ser. No. 795,207
Int. Cl.[4] C12Q *1/68;* C07H *15/12*
U.S. Cl. 435—6 21 Claims



1. A method for detecting the presence of strains of *C. burnetii* that are capable of causing chronic disease, comprising:

treating cells contained within a biological sample to expose cellular DNA;

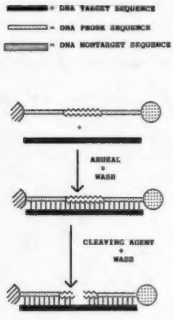
hybridizing the cellular DNA with a labeled DNA probe containing DNA sequences that specifically recognize *C. burnetii* DNA of strains associated with the capacity to cause chronic disease, the DNA sequences derived from a plasmid isolated from the Q177 Priscilla strain of *C. burnetii*; and

detecting the hybridized, labeled DNA probe and therefrom determining the presence of strains of *C. burnetii* capable of causing chronic disease.

4,876,187
NUCLEIC ACID COMPOSITIONS WITH SCISSILE LINKAGE USEFUL FOR DETECTING NUCLEIC ACID SEQUENCES

Peter Duck; Robert Bender, both of Ottawa; William Crosby, Saskatoon, and John G. Robertson, L'Ange Gardien, all of Canada, assignors to Meiogenics, Inc., Columbia, Md.

Filed Dec. 5, 1985, Ser. No. 805,279
Int. Cl.[4] C12Q *1/68;* C12P *19/34;* C07H *19/06;* G01N *33/566*
U.S. Cl. 435—6 53 Claims



21. A composition comprising the structure:

$$S—L[NA_1—S—NA_2]_nM$$

wherein NA_1 and NA_2 are nucleic acid sequences;

wherein —S— is a scissile linkage which is capable of being cleaved or disrupted without cleaving or disrupting the nucleic acid sequences of NA_1 or NA_2 or of a target nucleic acid sequence capable of hybridizing to the NA_1 and NA_2 sequences, or to the NA_1 and NA_2 sequences and the scissile linkage of said composition, wherein if the scissile linkage is a nucleic acid sequence it is RNA when both NA_1 and NA_2 are DNA sequences, or the scissile linkage is DNA when both NA_1 and NA_2 are RNA sequences;

wherein n is an integer from 1 to 4;

wherein the solid lines represent chemical bonds;

wherein X is a solid support;

wherein L is a chemical entity which links NA_1 to the solid support; and

wherein M is a marker.

4,876,188
NOVEL IMMUNOCHEMICAL METHOD FOR ASSAYING STABLE GLYCOSYLATED HEMOGLOBIN

Richard Smith, Del Mar; Peta-Maree Lamb, San Diego; Linda K. Curtiss, San Diego, and Joseph Witztum, San Diego, all of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Filed Nov. 18, 1986, Ser. No. 932,442
Int. Cl.[4] G01N *33/53, 33/72*
U.S. Cl. 435—7 14 Claims

1. A method of assaying the amount of stable glucohemoglobin in a glucohemoglobin-containing sample comprising the steps of:

(a) admixing said sample with a phthalic acid solution having a pH value of about 3 to about 6, at a ratio of at least about 1.5 millimoles of said acid per milligram of hemoglobin to form an acid reaction admixture;
(b) maintaining said acid reaction admixture for a predetermined time period at a temperature above about 0 degrees C. to about 37 degrees C. sufficient to remove the labile glucohemoglobin present, while maintaining the stable glucohemoglobin present in the original sample;
(c) admixing said acid reaction admixture with a water-compatible borohydride reductant at a ratio of at least about 0.015 moles of borohydride per milligram of hemoglobin to form a reduction reaction admixture;
(d) maintaining said reduction reaction admixture for a predetermined time period at a temperature above about 0 degrees C. to about 37 degrees C. sufficient to form glucitollysine-hemoglobin;
(e) separating said glucitolylsine-hemoglobin from any unreacted borohydride to form isolated glucitollysine-hemoglobin;
(f) admixing said isolated glucitollysine-hemoglobin with glucitollysine-specific antibody molecules or antibody combining site-containing portions thereof to form an immunoreaction admixture;
(g) maintaining said immunoreaction admixture under biological assay conditions for a time period sufficient for the antibody molecules or antibody combining site-containing portions thereto to immunologically bind to said glucitollysine-hemoglobin to form an immunoreactant; and
(h) determining the amount of immunoreactant that formed in the maintained immunoreaction admixture and thereby the amount of stable glucohemoglobin in said sample.

4,876,189

PROCESS FOR THE QUANTIFICATION OF CELL POPULATIONS OR SUBPOPULATIONS AND A REAGENT SUITABLE THEREFOR

Hartmut Schetters, Munich; Josef Endl, Gilching, and Winfried Albert, Pahl, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Nov. 5, 1986, Ser. No. 927,803

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3541033

Int. Cl.[4] G01N *33/545, 33/547, 33/552, 33/577*

U.S. Cl. 435—7 **11 Claims**

1. A process for the determination of the number of cells in a cell population or a cell subpopulation in a sample, comprising:
(1) providing a sample of cells;
(2) incubating said sample of cells with labelled antibodies specific to cell surface antigens of a cell population or a cell subpopulation under conditions favorable to a reaction between said cell surface antigens and said labelled antibodies, whereby the labelled antibodies complex with the cell surface antigens;
(3) providing a standard mixture of particles having a known particle concentration, said standard mixture of particles having a sedimentation behavior similar to the cells to be determined, a first portion of said mixture of particles comprising particles carrying a non-specific antibody and a second portion of said mixture of particles carrying molecules directed specifically against the labeled antibodies or a part thereof;
(4) incubating said standard mixture of particles with another portion of the labeled antibodies under conditions similar to conditions as the incubation of said sample in step (2), whereby the labeled antibodies complex with said second portions of said mixture of particles;
(5) separating the cells from the labeled antibodies that do not complex with the cell surface antigens;
(6) separating the particles from labeled antibodies that do not complex with the second portion of the mixture of particles;
(7) measuring the amount of labeling present on the separated cells and present on the separated particles; and
(8) determining the number of cells by comparing a value obtained by measuring the label on said cells with value obtained by measuring label attached to said mixture of particles.

4,876,190

PERIDININ-CHLOROPHYLL COMPLEX AS FLUORESCENT LABEL

Diether J. Recktenwald, Cupertino, Calif., assignor to Becton Dickinson & Company, Franklin Lakes, N.J.

Filed Oct. 21, 1987, Ser. No. 111,209

Int. Cl.[4] G01N *21/77, 33/533*

U.S. Cl. 435—7 **10 Claims**

1. In a diagnostic assay employing as a reagent a fluorescent compound conjugated to a member of a specific binding pair, wherein said pair comprises two biochemical molecules that bind specifically to each other and said diagnostic assay comprises a step in which the conjugated member of the specific binding pair binds to the other member of the specific binding pair, the improvement wherein
said flurescent compound is a peridinin-chloro-phyll-protein complex.

4,876,191

IMMOBILIZATION OF BIOLOGICALLY ACTIVE SUBSTANCES WITH CARRIER BOND ANTIBODY

Zeev Hollander, Herzlia; Beka Salomon, Herzlia Pituach, and Ephraim Katchalski-Katzir, Rehovot, all of Israel, assignors to Ramot University Authority for Applied Research and Industrial Development Ltd., Tel-Aviv, Israel

Filed Jul. 14, 1986, Ser. No. 885,155

Claims priority, application Israel, Jul. 17, 1985, 75828

Int. Cl.[4] G01N *33/573, 33/543;* **C12P** *1/00;* **C12N** *11/00*

U.S. Cl. 435—7 **8 Claims**

1. A composition which selectively binds a predetermined enzyme or isoenzyme which comprises the structure A-B.C wherein
A is a water-insoluble carrier,
B is a polyclonal anti-mouse antibody against the Fc region of monoclonal antibody C,
C is a monoclonal mouse immunoglobulin antibody having an Fc region which binds only to a predetermined enzyme or isoenzyme by an immunochemical bond and becomes attached to the enzyme or isoenzyme at a specific site which does not impair the catalytic activity of the enzyme or isoenzyme,
B being linked to A by a chemical covalent bond, and
C being attached to B by an immunochemical bond.

4,876,192

DETECTION OF ANTIBODIES AGAINST A CHORIONIC GONADOTROPIN-LIKE SUBSTANCE

Donald E. Weder, Highland, Ill., and Tsu T. Chi, Anaheim, Calif., assignors to Seven W. Enterprises, Inc., Highland, Ill.

Continuation-in-part of Ser. No. 778,847, Sep. 23, 1985, abandoned. This application Oct. 22, 1987, Ser. No. 112,473

Int. Cl.[4] C12Q *1/42;* **G01N** *33/53*

U.S. Cl. 435—21 **26 Claims**

1. A method of screening for a condition characterized by an elevated level of first antibodies against a chorionic gonadotropin-like substance, in a first subject other than domestic poultry, comprising:
contacting a first test specimen from the first subject with chorionic gonadotropin-like substance immobilized on a solid phase, under conditions permitting first antibody-chorionic gonadotropin-like substance binding;
removing unbound specimen components from the solid phase;
contacting a plurality of second antibodies, each comprising an immunological conjugate of the first antibody, with the

solid phase, under conditions permitting second antibody/first antibody binding;

removing unbound second antibodies from the solid phase; and

observing the presence of chorionic gonadotropin-like substance/first antibody/second antibody complex, if any, on the solid phase.

4,876,193

DETERMINATION OF SUPPRESSOR FUNCTIONAL RESERVE

A. Arthur Gottlieb, New Orleans, La., assignor to Imreg, Inc. (Delaware corporation), New Orleans, La.

Filed Feb. 24, 1986, Ser. No. 832,016

Int. Cl.[4] C12Q *1/02;* C12N *5/00*

U.S. Cl. 435—29 **20 Claims**

1. A method of determining a human or animal test subject's immune response, comprising:

(1) preparing a peripheral blood lymphocyte population from a blood sample taken from said test subject, thereby providing a first preparation;

(2) exposing a plurality of portions of said first preparation to a means for activating suppressor cells and to different predetermined concentrations of amplifier, wherein one of said portions is exposed to no amplifier, thereby providing a control level, said portions providing a second preparation;

(3) culturing said second preparation, thereby producing a first culture;

(4) exposing said first culture to a means for preventing cell division, and thereafter removing any residual amount of said means from said culture, thereby producing a nonproliferating culture;

(5) combining a further portion of a pheripheral blood lymphocyte population with said nonproliferating culture, thereby providing a responder preparation;

(6) exposing said responder preparation to a means for inducing a cell proliferation immune response, thereby producing a third preparation;

(7) culturing said third preparation, thereby producing a second culture; and

(8) determining an immune response index in said second culture.

4,876,194

PROTEIN L AND SUBFRAGMENTS THEREOF, WITH IMMUNOGLOBULIN BINDING ACTIVITY, A PROCESS FOR PREPARING THEREOF, REAGENT KIT, PHARMACEUTICAL COMPOSITION AND A *PEPTOCOCCUS MAGNUS* STRAIN

Lars Björck, Södra Sandby; Mats Erntell, and Erling Myhre, both of Lund, all of Sweden, assignors to Hightech Receptor AB, Malmo, Sweden

Filed Jul. 22, 1986, Ser. No. 887,926

Int. Cl.[4] C12P *21/00*

U.S. Cl. 435—68 **14 Claims**

12. A pure culture of a microorganism selected from the group consisting of Peptococcus magnus strain 312, ATCC No. 53516, and mutants thereof.

4,876,195

PROCESS FOR PRODUCING 2-KETO-D-GLUCARIC ACID

Hideo Shirafuji, Nagaokakyo; Takamasa Yamaguchi, Suita, and Ikuo Nogami, Nagaokakyo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

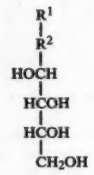
Filed Dec. 19, 1986, Ser. No. 946,504

Claims priority, application Japan, Dec. 26, 1985, 60-294577

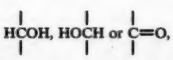
Int. Cl.[4] C07D *307/62;* A23L *3/34*

U.S. Cl. 435—137 **8 Claims**

1. A process for producing 2-keto-D-glucaric acid which comprises contacting a compound shown by the formula expressed as the chain structure



wherein R^1 is —CHO, —CH_2OH or COOH and R^2 is



with a bacterium belonging to the genus Pseudogluconobacter and being capable of oxidizing said compound, or processed matters thereof in a medium, producing and accumulating 2-keto-D-glucaric acid and then recovering the same.

4,876,196

METHOD OF CONTINUOUSLY PRODUCING ETHANOL FROM SUGAR-CONTAINING SUBSTRATES

Wolfgang Salzbrunn, Neustadt; Eva Steiner, Korneuburg; Wilfried Wöhrer, Bad Vöslau, and Otto Meixner, Vienna, all of Austria, assignors to Vogelbusch Gesellschaft m.b.H., Austria

Continuation of Ser. No. 783,923, Oct. 3, 1985, abandoned. This application Jan. 27, 1988, Ser. No. 149,955

Claims priority, application Austria, Oct. 18, 1984, A 3318/84

Int. Cl.[4] G12P *7/06, 7/14*

U.S. Cl. 435—161 **7 Claims**

1. A method of continuously producing ethanol from sugar-containing substrates comprising fermentation of the sugar in said substrates by a flocculating strain of *Zymomonas mobilis* cells under anaerobic conditions, the method consisting essentially of:

flowing a fermentation medium comprising said substrates and said *Zymomonas mobilis* cells through at least three fermentation stages of a fermentation system without preceding sterilization;

maintaining a concentration of at least 4% by volume of ethanol and a pH of about 5 in each of said fermentation stages;

maintaining a residence time of said fermentation medium in said fermentation stages of up to about 3 h., corresponding to a dilution rate of said fermentation medium in said fermentation stages of at least about $\frac{1}{3}h^{-1}$;

separating the *Zymomonas mobilis* cells after the final fermentation stage by sedimentation to form ethanol-containing substrates, and recycling said *Zymomonas mobilis* cells into the first fermentation stage; and

removing said ethanol-containing substrates separated from said *Zymomonas mobilis* cells.

4,876,197

EUKARYOTIC REGULATABLE TRANSCRIPTION

Rae Lyn Burke, San Francisco; Steven Rosenberg, Oakland; Jeffrey R. Shuster, Walnut Creek; Patricia A. Tekamp-Olson, and Pablo D. T. Valenzuela, both of San Francisco, all of Calif., assignors to Chiron Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 468,589, Feb. 22, 1983, abandoned, and a continuation-in-part of Ser. No. 609,540, May 11, 1984. This application Jul. 29, 1985, Ser. No. 760,197

Int. Cl.[4] C12P *15/00, 21/00, 2/1;* C12N *7/00*

U.S. Cl. 435—172.3 **14 Claims**

1. A DNA construct comprising in order of transcription a

first transcription regulatory region obtained from one of the yeast genes ADR3, the regulatory region of PHO5, or the regions regulated by GAL4, which provides for inducible transcriptional regulation; a second transcriptional initiation region from the yeast GAPDH gene of FIG. 2 and a terminator region.

4,876,198

METHOD FOR PRODUCTION OF AN ENZYME GRANULATE

Erik K. Markussen, Vaerloese, Denmark, assignor to Novo Industri A/S, Bagsvaerd, Denmark

Filed Aug. 19, 1988, Ser. No. 234,180
Claims priority, application Denmark, Aug. 21, 1987, 4355/87
Int. Cl.[4] C12N 9/00
U.S. Cl. 435—183 8 Claims

1. In a process for production of an enzyme granulate which comprises granulating an enzyme composition comprising enzyme, filler, binder, and from 1.5–40% by weight thereof of cellulose or artificial fibers, the enzyme added to the granulating process being in solution or suspension, and wherein the granulate product particles are separated into a middle fraction containing particles of the desired size interval, a small size fraction containing particles smaller than the desired size interval, and a large size fraction containing particles larger than the desired size interval with said small size and large size fractions being recirculated to the granulating process, the improvement which comprises:

recirculating the particles of said small size fraction without grinding of same, and

grinding the particles of said large size fraction then recirculating same, the particles of said large size fraction being ground so that the recirculated particles as a whole exhibit a cumulative particle size distribution curve of the same general shape as the cumulative particle size distribution curve of the aforesaid granulate product particles.

4,876,199

HYBRIDOMAS PRODUCING MONOCLONAL ANTIBODIES TO MONO-, DI-, AND TRIFUCOSYLATED TYPE 2 CHAIN

Sen-Itiroh Hakamori, Mercer Island, Wash., assignor to Fred Hutchinson Cancer Research Center, Seattle, Wash.

Filed Apr. 4, 1985, Ser. No. 728,821
Int. Cl.[4] C12N 5/00; C07K 15/04
U.S. Cl. 530—387 7 Claims

1. A hybridoma cell line producing a monoclonal antibody capable of specifically binding with a fucosylated type 2 chain structure selected from the group consisting of $III^3V^3Fuc_2nLc_6$ and $III^3V^3VII^3Fuc_3nLc_8$ but not specifically binding with $III^3FucnLc_4$, $V^3FucnLc_6$, $III^3FucnLc_6$, or $VI^2FucnLc_6$.

5. A hybridoma cell line capable of producing a monoclonal antibody specifically binding with fucosylated type 2 chain structure $III^3V^3VII^3Fuc_3nLc_8$ but not specifically binding with any of $III^3FucnLc_4$, $III^3FucnLc_6$, and $VI^2FucnLc_6$.

4,876,200

NEW STRAINS OF PSEUDOMONAS PUTIDA

John A. Schofield; Peter R. Betteridge; George Ryback, all of Sittingbourne, and Philip J. Geary, Ashford, all of England, assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 1, 1987, Ser. No. 68,493
Claims priority, application United Kingdom, Jul. 8, 1986, 8616612; Jul. 8, 1986, 8616613
Int. Cl.[4] C12P 7/22; C12R 1/40
U.S. Cl. 435—253.3 1 Claim

1. A biological pure culture of *Pseudomonas putida* NCIB 12190.

4,876,201

METHOD FOR BIODEGRADING PCBS

Donna L. Bedard, Latham, and Michael J. Brennan, Jr., Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 855,274, Apr. 24, 1986. This application Feb. 27, 1989, Ser. No. 316,194
Int. Cl.[4] C12N 1/20; C12R 1/05; C02F 3/00, 1/68
U.S. Cl. 435—262 8 Claims

1. A method for biodegrading halogenated organic waste comprising PCB congeners having up to five or more chlorine atoms per molecule, which comprises treating the halogenated organic waste under aerobic conditions with an effective amount of a biologically pure culture of *Alcaligenes eutrophus* NRRLB-15940.

4,876,202

CHIMERIC PLASMIDS

Hiromi Ishiwa, Kodaira; Harue Shibahara, Nishitama; Masahiko Mutai, Higashiyamato, and Nobuo Tsuchida, Yokohama, all of Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Continuation-in-part of Ser. No. 574,180, Jan. 24, 1984, abandoned, and a continuation-in-part of Ser. No. 737,038, May 22, 1985, abandoned. This application Nov. 18, 1987, Ser. No. 125,396
Claims priority, application Japan, Jan. 24, 1983, 58-9740; Jun. 8, 1983, 58-103196; Aug. 31, 1983, 58-159345; Jan. 10, 1984, 59-2361; May 24, 1984, 59-105411
Int. Cl.[4] C12N 7/00, 15/00; C07H 15/12
U.S. Cl. 435—320 6 Claims

1. A chimeric plasmid denoted pHY460 comprising:

(a) a tetracycline resistance gene of plasmid pAMα1 and a first DNA replication origin of plasmid pAMα1, said tetracycline resistance gene being operable as a marker gene in strains of both *Escherichia coli* and *Bacillus subtillis* and said first DNA replication origin being operable in strains of *Bacillus subtillis;*

(b) an ampicillin resistance gene and a second DNA replication origin, both separated from a vector pACYC177, said ampicillin resistance gene being operable as a marker gene solely in strains of *Escherichia coli* and said second DNA replication origin being operable in strains of *Escherichia coli;*

(c) a unique restriction and cleavage site for the restriction enzyme BalI within said tetracycline resistance gene;

(d) a unique restriction and cleavage site for the restriction n enzyme BglI within said ampicillin resistance gene; and

(e) a unique restriction and cleavage site for the restriction enzyme PstI within said ampicillin resistance gene,

wherein the approximate molecular weight of said chimeric plasmid is 4.6 Md and the cleavage map of the plasmid is as shown is FIG. 7 of the Drawings.

4,876,203

METHOD OF PERFORMING MEDICAL ANALYSIS ON A LIQUID SAMPLE USING AT LEAST ONE DRY REAGENT, AND APPARATUS FOR THE METHOD

Jean Guigan, 9, rue Jean Mermoz, 75008 Paris, France

Filed Oct. 22, 1985, Ser. No. 790,021
Claims priority, application France, Oct. 26, 1984, 84 16448
The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.
Int. Cl.[4] G01N 21/07
U.S. Cl. 436—45 6 Claims

1. A method of performing medical analysis on a liquid sample using at least one dry reagent together with a diluent, using a container having internal compartments including:

a storage chamber for said liquid sample connected via a capillary duct to one end of a calibrated cell whose other end is connected via a capillary duct to an overflow chamber;

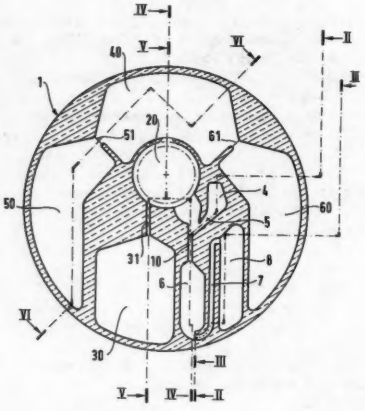
a storage chamber for said liquid diluent;

a pouring chamber, a capillary duct connected at one end to said pouring chamber and on the other end to said calibrated cell, a capillary duct connected at one end to said pouring chamber and at the outer end to said diluent storage chamber, and a further capillary duct connected at one end to said pouring chamber and at the other end with a first reaction chamber suitable for containing a dry reagent; and

two reaction chambers suitable for containing dry reagents situated on either side of said first reaction chamber, and connected via capillary ducts having different angular orientations;

a lid for closing said container fitted both with a sample storing receptacle connected directly with said sample storage chamber and situated thereabove, and with a removable stopper which penetrates into said pouring chamber to close the ends of said capillary ducts leading thereto; and

means provided for mounting said container on the turntable of a centrifuge with the axis of the container offset from the axis of the turntable for rotation of the container about said container axis to a plurality of different predetermined positions relative to the turntable and through a given angle to permit selective alignment of a given capillary duct with the direction of centrifuging force resulting from turntable rotation;



said method comprising the steps of:

providing a liquid diluent initially in said diluent storage chamber and dry reagents in respective ones of said reaction chambers;

inserting said sample into the sample storing receptacle and then flowing said sample under gravity into said sample storage chamber, removing said stopper, mounting said container on said centrifuge turntable, operating said turntable and performing a plurality of successive centrifuging operations, while setting the angular position of the container on each occasion from among said predetermined angular positions as a function of the orientation of the capillary duct concerned relative to the direction of centrifugal force in such a manner as to cause said sample to pass successively via said capillary ducts from said sample storage chamber into said calibrated cell, then into said pouring chamber, and then into said first reaction chamber, and subsequently into each of the other reaction chambers.

4,876,204

METHOD AND APPARATUS OF AUTOMATIC CONTINUOUS ANALYSIS USING ANALYTICAL IMPLEMENT

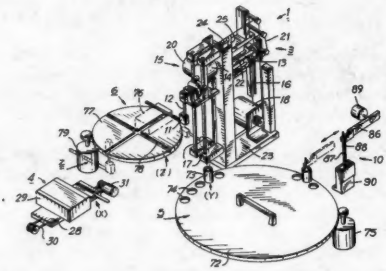
Kazushige Inoue, Ibaraki; Hiroshi Yamamoto, Uji; Hiroshi Hyodo, Kyoto, and Shinichi Kishimoto, Kuze, all of Japan, assignors to Kabushiki Kaisha Kyoto Daiichi Kagaku, Kyoto, Japan

Filed Oct. 1, 1985, Ser. No. 782,356

Claims priority, application Japan, Oct. 11, 1984, 59-213592; Nov. 5, 1984, 58-232678

Int. Cl.[4] G01N *35/04*

U.S. Cl. 436—46 **13 Claims**



1. An automatic continuous analysis method using an analytical implement having a reagent section, comprising: a transfer process and a measuring process, said transfer process including the steps of supplying analytical implements one by one from an automatic supply device, holding each analytical implement supplied by the automatic supply device by an analytical-implement automatic handling device, moving each analytical implement to a position above a sample vessel which is successively brought into a specified position where each analytical implement is to be dipped into the sample vessel, dipping each analytical implement in a sample solution in the sample vessel and pulling it up after a specified time, moving each implement above a reaction turntable and setting it on the reaction turntable and releasing each analytical implement from the analytical-implement automatic handling device, said measuring processing including the step of automatically measuring, after a specified time, light reflectance of the reagent section of each analytic implement.

4,876,205

ELECTROCHEMICAL ASSAY FOR HAEMOGLOBIN

Monika J. Green, Buckinghamshire, and Roger J. Lias, Oxon, both of Great Britain, assignors to Medisense, Inc., Cambridge, Mass.

Filed Aug. 12, 1987, Ser. No. 84,983

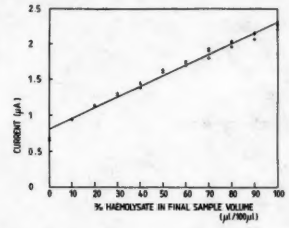
Claims priority, application United Kingdom, Aug. 12, 1986, 8619627

Int. Cl.[4] G01N *27/56, 33/49*

U.S. Cl. 436—66 **8 Claims**

1. A method for the assay of haemoglobin in blood comprising contacting the blood with a sufficient amount of a ferricya-

nide so that haemoglobin in the blood is reacted therewith and the haemoglobin is electrochemically assayed by monitoring



the current change produced on reduction of the ferricyanide by the hemoglobin.

4,876,206

METHODS FOR DETECTING RARE EARTH MINERALS

Wayne L. Sayer, 4213 Canal Cir., Las Vegas, Nev. 89122

Filed Feb. 10, 1989, Ser. No. 309,422
Int. Cl.[4] G01N *33/20*
U.S. Cl. 436—82 51 Claims

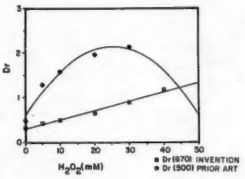
1. A method for detecting rare earth minerals in the field comprising the steps of:
   (a) obtaining an ore sample to be tested for the presence of rare earth minerals;
   (b) mixing the ore sample with a basic reagent to form a mixture;
   (c) treating the mixture with a halide acid;
   (d) allowing the mixture to react and dry; and
   (e) examining the ore sample under a shortwave ultraviolet light for fluorescence of a red-orange color.

4,876,207

COMPOSITIONS FOR THE DETECTION OF HIGH LEVELS OF HYDROGEN PEROXIDE

Arthur R. Mack, II, Penn Yan, and John W. H. Sutherland, Jr., Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 16, 1988, Ser. No. 156,129
Int. Cl.[4] G01N *33/00*
U.S. Cl. 436—135 14 Claims



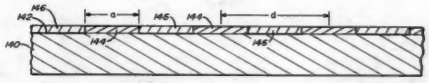
4. A method for determining hydrogen peroxide levels in aqueous solution having a pH comprising the steps of:
   (a) adjusting the pH of the aqueous solution between 5 and 10;
   (b) providing a peroxidase active material;
   (c) providing a composition comprising 1,10-phenanthroline and 1,7-dihydroxynaphthalene;
   (d) combining (a), (b) and (c) to form a dye; and
   (e) determining the hydrogen peroxide level photometrically from the dye.

4,876,208

DIFFRACTION IMMUNOASSAY APPARATUS AND METHOD

Eric K. Gustafson, Palo Alto; Rick Trebino, Livermore, and John Lee, Cupertino, all of Calif., assignors to Yellowstone Diagnostics Corporation, Sunnyvale, Calif.

Filed Jan. 30, 1987, Ser. No. 9,177
Int. Cl.[4] G01N *33/545*
U.S. Cl. 436—531 9 Claims



1. A diffraction immunoassay plate for use in a light diffraction immunoassay comprising a surface selected from the group consisting of polysilicon and crystalline silicon surfaces having on said surface, a biological diffraction grating design of lines of active binding reagent.

6. A diffraction binding assay method for determining the presence or quantity of an analyte in an aqueous sample comprising
   (a) contacting a diffraction binding assay surface with the sample for time sufficient to permit conjugation of binding reagent and analyte, the diffraction binding assay surface being selected from the group consisting of polysilicon and single crystalline silicon surfaces having on said surface, a light disturbing design of substantially non-light disturbing binding reagent thereon, the binding reagent being selected to bind selectively with the analyte;
   (b) separating the surface from the sample; and
   (c) illuminating the diffraction binding assay surface with light from a light source, and determining the light diffraction by the diffraction binding assay surface.

4,876,209

METHOD OF MAKING AVALANCHE PHOTODIODE

Stephen R. Forrest, Torrance, Calif., assignor to U.S.C., Los Angeles, Calif.

Division of Ser. No. 141,320, Jan. 6, 1987, Pat. No. 4,857,982.
This application May 12, 1989, Ser. No. 351,063
Int. Cl.[4] H01L *21/76*
U.S. Cl. 437—5 3 Claims

1. A method of manufacturing an avalanche photodiode, comprising the steps of:
   epitaxially depositing a buffer region of a first semiconductor material over a substrate;
   epitaxially depositing a ternary absorption region of a second semiconductor material, doped with an impurity of a first conductivity type over said buffer region;
   epitaxially depositing a multiplication region, composed of said first semiconductor material and doped with an impurity of said first conductivity type except at its upper surface (where said multiplication region is doped with a low concentration of an impurity of said first conductivity type), over said ternary absorption region;
   depositing a first diffusion barrier film over said multiplication region, defining by photolithography a diffusion window using a positive resist;
   diffusing and doping said upper surface of said multiplication region with an impurity of a second conductivity type in a central region of said upper surface of the multiplication region;
   diffusing and doping a plurality of concentric rings on said upper surface surrounding said central region, said rings composed of the same material and conductivity type as said central region;
   depositing a second diffusion barrier film over said first barrier film, for protecting said upper surface of said

multiplication region and confining said central region to the center of said diffusion window;

thermally depositing a metal alloy as a conductivity contact for said central region; said contact not connected to said concentric rings;

whereby said avalanche photodiode is complete which has an edge junction breakdown barrier to enhance the gain of said photodiode.

4,876,210

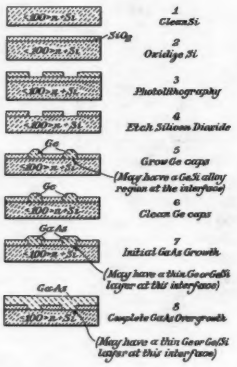
SOLUTION GROWTH OF LATTICE MISMATCHED AND SOLUBILITY MISMATCHED HETEROSTRUCTURES

Allen M. Barnett, Newark, Del., and John C. Zolper, Glen Rock, N.J., assignors to The University of Delaware, Newark, Del.

Continuation of Ser. No. 44,151, Apr. 30, 1987, abandoned. This application Mar. 4, 1988, Ser. No. 163,897

Int. Cl.[4] H01L *31/18, 21/208*

U.S. Cl. 437—5 **14 Claims**



1. In a method of making semiconductor structures by solution growth of heterostructure layers wherein a heterostructure capping layer is solution grown on a substrate and is subsequently at last partially removed by dissolution during solution growth of a second, different heterostructure layer, the improvement comprising preparation of the substrate surface by the solution grown heterostructure capping layer to facilitate solution growth of the second heterostructure layer.

4,876,211

METHOD FOR FABRICATING VARACTOR DIODES USING ION IMPLANATION

Hilda Kanber, Rolling Hills Estates, and James C. Chen, Torrance, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 9, 1988, Ser. No. 230,093

Int. Cl.[4] H01L *29/93*

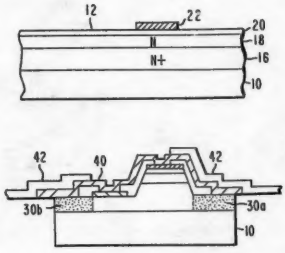
U.S. Cl. 437—22 **17 Claims**

1. A method for manufacturing semiconductor structures having varactor profiles having deep N^+ type conductivity layers including the steps of:

providing a semi-insulating substrate of III-V semiconductor material having an essentially flat major surface;

implanting first silicon ions through said major surface of said substrate at an energy level in the range of from about 5 to 7 MeV and of a dose of from about 1×10^{14} to 1×10^{15} ions/cm^2;

implanting second silicon ions through said major surface of said substrate at an energy level less than the energy level of said first implanting step and in the range of from about 3 to 5 MeV and of a dose of from about 1×10^{14} to 1×10^{15} ions/cm^2;



implanting sulfur ions through said major surface of said substrate at an energy level of from about 5 to 7 MeV and a dose of from about 1×10^{14} to 1×10^{15} ions/cm^2, thereby providing a deeply buried N^+ type conductivity layer.

4,876,212

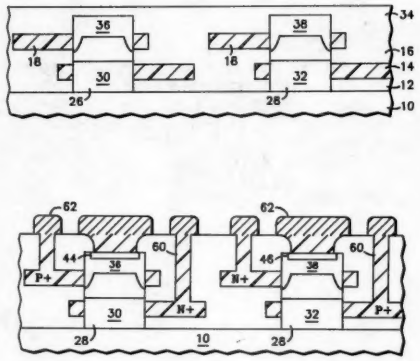
PROCESS FOR FABRICATING COMPLIMENTARY SEMICONDUCTOR DEVICES HAVING PEDESTAL STRUCTURES

Daniel N. Koury, Ithaca, N.Y., assignor to Motorola Inc., Schaumburg, Ill.

Filed Oct. 1, 1987, Ser. No. 103,321

Int. Cl.[4] H01L *21/265, 21/20*

U.S. Cl. 437—34 **24 Claims**



1. A process for fabricating complimentary semiconductor devices having pedestal structures comprising the steps of:

providing a first substrate;

forming a first dielectric layer on said first substrate;

forming a first polysilicon layer on said first dielectric layer;

patterning and etching said first polysilicon layer in a predetermined manner;

doping said first polysilicon layer with a plurality of conductivity types;

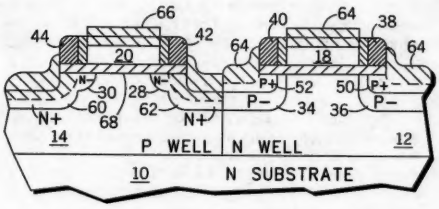
forming a second dielectric layer on said first polysilicon layer;
forming a second polysilicon layer on said second dielectric layer;
patterning and etching said second polysilicon layer in a predetermined manner;
doping said second polysilicon layer with a plurality of conductivity types;
forming a third dielectric layer on said second polysilicon layer;
patterning and forming a plurality of openings through said first, second and third dielectric layers and said first and second polysilicon layers, said openings extending from said first substrate;
forming epitaxial regions in said openings; and
forming a plurality of contact openings, members of said plurality of contact openings extending to said first polysilicon layer, said second polysilicon layer and said epitaxial regions.

4,876,213

SALICIDED SOURCE/DRAIN STRUCTURE

James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 31, 1988, Ser. No. 264,925
Int. Cl.[4] H01L *21/265, 2/70*
U.S. Cl. 437—34 **5 Claims**



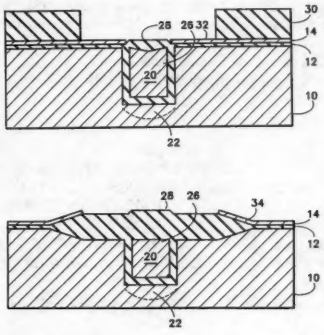
1. A process for fabricating a CMOS device comprising the steps of:
providing a silicon substrate having first and second surface regions of first and second conductivity type, respectively;
providing first and second polycrystalline silicon gate electrodes overlying said first and second surface regions;
forming source and drain regions of second and first conductivity type, respectively, self aligned with said first and second gate electrodes;
forming sidewall spacers on the edges of each of said gate electrodes;
introducing impurities of said first conductivity type into said first and second surface regions using said sidewall spacers as masking elements;
removing said impurities of said first conductivity type from said surface region of said first conductivity type by overetching of said substrate surface;
selectively introducing impurities of second conductivity type into said surface region of said first conductivity type using said sidewall spacers as masking elements; and
forming silicide regions on said first and second surface regions using said sidewall spacers as silicide masks.

4,876,214

METHOD FOR FABRICATING AN ISOLATION REGION IN A SEMICONDUCTOR SUBSTRATE

Tadanori Yamaguchi, Hillsboro; Evan Patton; Eric Lane, both of Portland, and Simon Yu, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 2, 1988, Ser. No. 201,491
Int. Cl.[4] H01L *21/265, 21/76*
U.S. Cl. 437—038 **18 Claims**



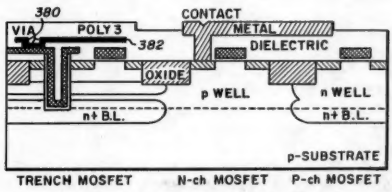
1. A method for fabricating an isolation region in a semiconductor substrate comprising the steps of:
forming antiinsulating layer on said substrate;
forming a mask layer on said insulating layer;
forming a trench in said mask layer, said insulating layer and said substrate;
oxidizing an inner surface of said trench to extend said insulating layer into said trench;
filling a portion of said trench with semiconductor material;
initially oxidizing an upper surface of said semiconductor material to extend said insulating layer over said trench;
removing portions of said mask layer to expose portions of said insulating layer adjacent said trench; and
further oxidizing said upper surface of said semiconductor material and portions of said substrate adjacent said trench.

4,876,215

METHOD OF MAKING A STATIC RAM CELL WITH TRENCH PULL-DOWN TRANSISTORS AND BURIED-LAYER GROUND PLATE

Fu-Chieh Hsu, Cupertino, Calif., assignor to Integrated Device Technology, Inc., Santa Clara, Calif.

Division of Ser. No. 69,168, Jul. 2, 1987. This application Aug. 23, 1988, Ser. No. 236,209
Int. Cl.[4] H01L *21/425, 21/38*
U.S. Cl. 437—60 **5 Claims**



1. In a method of fabricating a SRAM cell, of the type wherein p- well regions, active island regions, conductive layers, loads, interconnections, insulators, contact hole openings, metal line definitions, and passivations are all formed on

an epitaxial silicon layer, the improvement comprising in combination the steps of:

forming an isolated, buried, n+ layer on a p- substrate;

growing the epitaxial silicon layer on said substrate;

forming p- well regions in said grown epitaxial silicon layer;

forming active island regions in said grown epitaxial silicon layer;

performing a pull-down transistor threshold voltage adjustment;

masking for trench formation;

etching at least one trench into said grown epitaxial silicon layer so that the bottom of said trench is inside said buried layer;

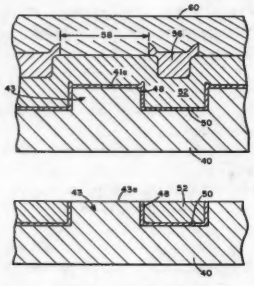
forming a dielectric in said trench; and

forming a conductive layer as a gate electrode for a trench transistor.

4,876,216
SEMICONDUCTOR INTEGRATED CIRCUIT MANUFACTURING PROCESS PROVIDING OXIDE-FILLED TRENCH ISOLATION OF CIRCUIT DEVICES

Eric Tobias, and Chau-Shiong A. Chen, both of San Diego, Calif., assignors to Applied Micro Circuits Corporation, San Diego, Calif.

Filed Mar. 7, 1988, Ser. No. 164,556
Int. Cl.[4] H01L *21/314*
U.S. Cl. 437—67 **5 Claims**



1. In a process for manufacturing an integrated circuit device on a semiconductor substrate, an improvement for isolating individual circuit elements in said device, comprising the steps of:

forming a device area having an upper surface on a surface of said substrate by a trenching process which forms a trench adjacent said device area, said trench having a side surface which extends to said device area;

forming a relatively thin insulating layer of oxide covering said device area upper surface, said trench side surface and the floor surface of said trench;

applying, over said thin insulating layer, an insulating layer of crystalline dielectric material which is relatively thicker than said thin insulating layer and which fills said trench at least to the level of said device area upper surface;

applying a first layer of photoresist over said thicker insulating layer and photolithographically removing the portion of said first layer which overlies said device area;

applying a relatively planar second layer of photoresist over said first layer of photoresist; and

removing said second layer, said first layer and said relatively thicker insulating layer by means of a removal process in which removal proceeds toward said substrate surface from said second layer and which removes the photoresists of said first and second layers, the oxide of said relatively thin layer and the crystalline dielectric material at substantially the same removal rate, and ceasing said removing when said removal process has progressed to the point at which the level of said device area is reached and said device area is exposed.

4,876,217
METHOD OF FORMING SEMICONDUCTOR STRUCTURE ISOLATION REGIONS

Peter J. Zdebel, Mesa, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Mar. 24, 1988, Ser. No. 173,482
Int. Cl.[4] H01L *21/76*
U.S. Cl. 437—67 **7 Claims**

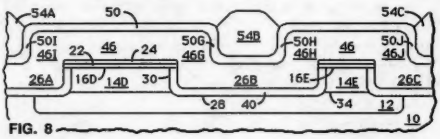


FIG. 8

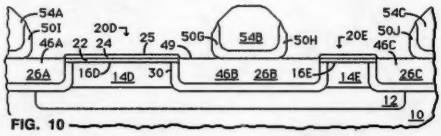


FIG. 10

1. A process for forming one or more dielectric isolation regions for a semiconductor device, comprising:

providing a semiconductor substrate having a principal surface;

forming on the principal surface a first mask resistant to etching of the substrate and having one or more openings with edges extending to the surface where the dielectric isolation regions are desired;

etching the substrate through the openings to form a trench extending into the substrate from the surface wherein the trench has a bottom spaced a vertical first distance from the surface and sidewalls located under the first mask a lateral second distance from the edges of the openings;

forming a first dielectric on the bottom and sidewalls of the trench having an outer surface on the trench sidewalls substantially aligned with the mask edges and a first thickness less than the first distance;

forming a second dielectric on the first dielectric and having a second thickness equal or greater than the first distance minus the first thickness;

providing a second mask over the second dielectric having one or more closed regions corresponding to the openings of the first mask and located laterally within the openings of the first mask and laterally smaller than the first openings by at least the second thickness;

removing at least a first portion of the second dielectric layer above the first mask while leaving at least a second portion of the second dielectric layer substantially filling the trench; and

removing the second mask.

4,876,218
METHOD OF GROWING GAAS FILMS ON SI OR GAAS SUBSTRATES USING ALE

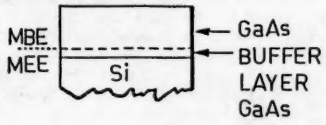
Markus Pessa; Harry Asonen; Jukka Varrio, and Arto Salokatve, all of Tampere, Finland, assignors to Oy Nokia Ab, Helsinki, Finland

Filed Sep. 26, 1988, Ser. No. 248,845
Claims priority, application Finland, Sep. 29, 1987, 874260
Int. Cl.[4] H01L *21/20, 21/203*
U.S. Cl. 437—107 **3 Claims**

1. A molecular beam epitaxy method of growing a GaAs film on the surface of a Si or GaAs substrate by exposing the growing surface of the substrate in a vacuum to at least one

vapour beam containing the Ga elementary component of the GaAs compound, and to at least one vapour beam containing the As elementary component of the GaAs compound, characterized by the steps of

(A) growing a GaAs buffer layer on the substrate by alternately applying the elements of the GaAs compound to the surface of a substrate heated to a first temperature one atom layer at a time, whereby in the formation of each



atom layer the growing surface is exposed to a vapour beam containing one elementary component of the GaAs compound only; and

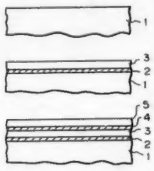
(B) subsequently heating the substrate to a second temperature higher than the first temperature, and growing another GaAs layer on the buffer layer by applying both of the elementary components of the GaAs compound simultaneously.

4,876,219

METHOD OF FORMING A HETEROEPITAXIAL SEMICONDUCTOR THIN FILM USING AMORPHOUS BUFFER LAYERS

Takashi Eshita, Inagi; Fumitake Mieno; Yuji Furumura, both of Kawasaki, and Takuya Watanabe, Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 3, 1989, Ser. No. 318,638
Claims priority, application Japan, Mar. 4, 1988, 63-49652
Int. Cl.[4] H01L *21/20*
U.S. Cl. 437—126 **8 Claims**



1. A method of forming a semiconductor thin layer on a silicon substrate comprising the steps of depositing a first amorphous layer of a compound semiconductor on said silicon substrate, and growing a first epitaxial layer of the compound semiconductor on said amorphous layer, characterized in that said method further comprises the steps of: after said epitaxial growth step, depositing a second amorphous layer of the compound semiconductor on said first epitaxial layer, and growing a second epitaxial layer of the compound semiconductor on said second amorphous layer.

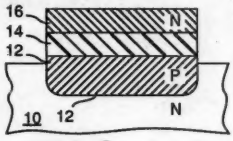
4,876,220

METHOD OF MAKING PROGRAMMABLE LOW IMPEDANCE INTERCONNECT DIODE ELEMENT

Amr M. Mohsen, Saratoga; Esmat Z. Hamdy, Fremont, and John L. McCollum, Saratoga, all of Calif., assignors to Actel Corporation, Sunnyvale, Calif.

Division of Ser. No. 864,038, May 16, 1986. This application Nov. 13, 1987, Ser. No. 104,404
Int. Cl.[4] H01L *21/22, 21/465*
U.S. Cl. 437—170 **4 Claims**

1. In a semiconductor structure including a first region of semiconductor material of a first conductivity type, an insulating material over said first region, said insulating layer including a first region of silicon dioxide, a second region of silicon nitride over said first region, and a third layer of silicon dioxide over said second region, a second region of semiconductor material of a second conductivity type over said insulating layer, a method of creating a diode including the step of:



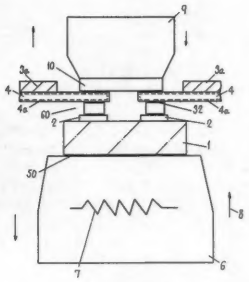
applying a voltage between said first and second regions for a time sufficient to create a controlled radius filament of material from at least one of said first or second regions through said insulating material to form a diode.

4,876,221

BONDING METHOD

Kenzo Hatada, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 3, 1988, Ser. No. 191,023
Int. Cl.[4] H01L *21/60*
U.S. Cl. 437—212 **2 Claims**



1. A method for bonding one of the principal opposite faces of a flat connecting lead to an electrode on one of the principal opposite surfaces of a semiconductor element by means of a metal bump already bonded to said one principal face of the lead or to said electrode, comprising:

supporting the opposite principal surface of the semiconductor element on a supporting tool which is capable of heating the semiconductor element;

positioning the flat connecting lead with the one principal opposite face opposed to the electrode on the semiconductor element with the metal bump therebetween;

providing a jig having a lead engaging face thereon and having at least the lead engaging face of a heat resistant heat insulating material which is other than a material which will alloy with the material of the connecting lead;

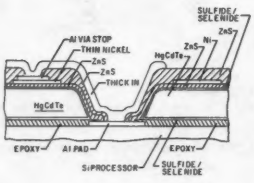
positioning said lead engaging face opposite the other of the principal opposite face of the connecting lead;

moving said jig and said supporting tool toward each other to bring the lead engaging face of the jig into contact with the other of the principal opposite face of the connecting lead and to press the metal bump into pressure contact between the electrode and the semiconductor element while at the same time heating said supporting tool to a temperature sufficient to heat the opposite principal surface of the semiconductor element to a temperature higher than the one principal opposite surfaces of the semiconductor element for bonding the metal bump to the electrode or the lead.

4,876,222
SEMICONDUCTOR PASSIVATION

Joseph D. Luttmer, Richardson, and D. Dawn Little, Euless, both of Tex., assignors to Texas Instrument Incorporated, Dallas, Tex.

Division of Ser. No. 101,056, Sep. 25, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 251,950
Int. Cl.[4] H01L *21/00, 21/02, 21/306, 21/31*
U.S. Cl. 437—225 **4 Claims**



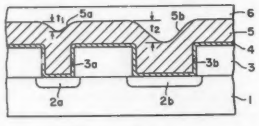
1. A method of passivating a $Hg_{1-x}Cd_xTe$ substrate, comprising the step of:

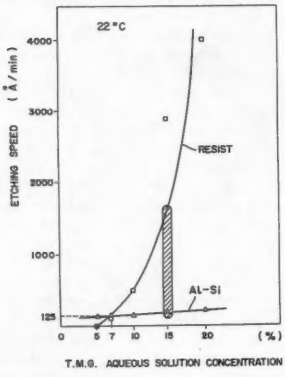
(a) growing a passivating layer on said substrate by chemical reaction in the absence of an applied electrochemical current in a solution containing ions from the group consisting polysulfide, polyselenide, and a combination of the two.

4,876,223
METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES

Takashi Yoda, and Tohru Watanabe, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 20, 1988, Ser. No. 260,300
Claims priority, application Japan, Oct. 21, 1987, 62-265943
Int. Cl.[4] H01L *21/00, 21/02, 21/306, 21/465*
U.S. Cl. 437—228 **9 Claims**





1. A method of manufacturing a semiconductor device comprising the steps of:

forming an insulating film on a semiconductor substrate;

forming a recess such as a contact hole, wiring trench or the like in said insulating film;

forming a wiring material film on said insulating film and said recess to fill said wiring material at least within said recess;

coating a coating film on the surface of said wiring material film in a manner to make the surface of said coating film flat;

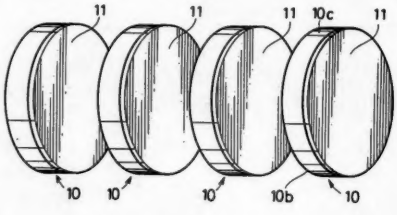
etching said coating film and said wiring material film sequentially, by using tetra-methyl-guanidine having the same etching speed with respect to said coating film and said wiring material film, to leave said wiring material film only within said recess and remove said wiring material film on said insulating film, in such a manner that the upper surface of said wiring material film left unetched within said recess is made substantially flush with the upper surface of said insulation film, and is made substantially flat; and

forming another wiring material film on said wiring material film and said insulation film to obtain electric connection between said other wiring material film and said wiring material film.

4,876,224
SILICON WAFER FOR A SEMICONDUCTOR SUBSTRATE AND THE METHOD FOR MAKING THE SAME

Kenji Kusakabe, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,495
Claims priority, application Japan, Jun. 30, 1987, 62-164354
Int. Cl.[4] H01L *21/324*
U.S. Cl. 437—228 **7 Claims**



1. A method for manufacturing a silicon wafer for a semiconductor substrate comprising the steps of

forming a polycrystalline silicon layer on the entire surface of a silicon wafer body of a silicon wafer,

etching and removing that portion of the polycrystalline silicon layer which is formed on the side surface of the silicon wafer body, and

polishing and removing the polycrystalline silicon layer on the front surface of the silicon wafer body.

4,876,225
CANTILEVERED DIFFUSION CHAMBER ATMOSPHERIC LOADING SYSTEM AND METHOD

Edward A. Wagner, Alamo, and Harold C. Guiver, Benicmond, both of Calif., assignors to Berkeley Quartz Lab, Inc., Pleasanton, Calif.

Continuation of Ser. No. 51,844, May 18, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,384
Int. Cl.[4] F16B *39/24;* **F27D** *3/00, 5/00*
U.S. Cl. 437—248 **10 Claims**

1. A method of moving articles into and out of an open end of a processing chamber, comprising the steps of:

loading the articles onto an elongated cantilevered support outside of said processing chamber,

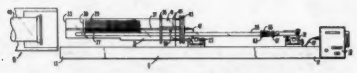
providing relative motion between a cantilevered enclosure

that surrounds said support and the elongated support such that the articles are surrounded by the enclosure,

moving the support and enclosure together into an end of the processing chamber in a manner that said enclosure is sealed against an open end of the processing chamber,

providing relative motion between the elongated support and the enclosure such that the articles are positioned outside of said enclosure while within said processing chamber,

conducting the processing of the articles within the processing chamber with the articles positioned outside of said



enclosure, said processing including heating of the articles,

after such processing, providing relative motion between the elongated support and the enclosure in a manner to reposition the articles within said enclosure,

removing the article support and enclosure together from said end of the processing chamber, and

providing relative motion between the elongated support and the enclosure such that the articles are positioned outside of said enclosure, whereby the processed articles may be unloaded off of the support.

4,876,226

SILICON CARBIDE SINTERING

Ricardo I. Fuentes, 2022 Renee Dr., Eagle Pass, Tex. 78852

Filed Jan. 12, 1987, Ser. No. 2,106

Int. Cl.[4] C04B *35/46*

U.S. Cl. 501—89 **22 Claims**

1. A pressureless liquid phase sintering method for increasing the density of silicon carbide comprising the steps of

adding alumina and at least 0.1% by weight of a calcia catalyst to said silicon carbide to form a sintering composition,

said sintering composition being substantially free of rare earth oxides; and

heating said composition at a sintering temperature sufficient to form a liquid phase comprising aluminum oxycarbides for promoting the densification of said sample,

the amount of said calcia catalyst being sufficient to cause the amount and rate of formation of said liquid phase to be greater than that produced using said alumina alone.

21. A pressureless sintering method for increasing the density of silicon carbide comprising the steps of

adding at least one aluminum oxycarbide to said silicon carbide to form a sintering composition,

said sintering composition being substantially free of rare earth oxides; and

sintering said composition at a temperature sufficient to increase said density of said silicon carbide.

4,876,227

REACTION SINTERED BORIDE-OXIDE-SILICON NITRIDE FOR CERAMIC CUTTING TOOLS

Thomas P. DeAngelis, Big Flats, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Continuation of Ser. No. 886,925, Jul. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 853,897, Apr. 21, 1986, abandoned. This application Aug. 24, 1988, Ser. No. 235,977

Int. Cl.[4] C04B *35/58*

U.S. Cl. 501—97 **16 Claims**

1. A ceramic composition consisting essentially of a dense homogeneous sintered body whose composition is selected from:

(a) composition A consisting essentially of a dense homogeneous sintered body consisting on a mole percent basis, of 2 to 53% silicon nitride, where some or all of the silicon nitride is present as a separate phase or in solid solution with aluminum oxide as silicon-aluminum-oxynitride, and about 10 to 61% boride phase or phases of one or both of the elements Ti and Zr, and 37 to 88% oxide phase or phases of one or more of the elements of groups 3a, 4a, 3b, including lanthanide and actinide series elements, 4b, 5b, 6b and 8 of the periodic chart; and mixtures of any of the foregoing, or

(b) composition B consisting essentially of a dense homogeneous sintered body consisting, on a mole percent basis, of 5 to 48% silicon nitride, where some or all of the silicon nitride is present as a separate phase or in solid solution with aluminum oxide as silicon-aluminum-oxynitride, and about 37 to 80% boride phase or phases of one or both of the elements Ti and Zr, and 15 to 25% oxide phase or phases of one or more of the elements of groups 3a, 4a, 3b, including lanthanide and actinide series elements, 5b, 6b, and 8 of the periodic table; and mixtures of the foregoing.

4,876,228

ZEOLITE MODIFICATIONS

Clarence D. Chang, Princeton; Cynthia T-W Chu, Pennington; Pochen Chu, West Deptford; Ralph M. Dessau, Edison; William E. Garwood, Haddonfield; Guenter H. Kuehl, Cherry Hill; Joseph N. Miale, Lawrenceville, and David S. Shihabi, Pennington, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 24,904, Mar. 12, 1987, abandoned, which is a continuation of Ser. No. 724,370, Apr. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 631,687, Jul. 16, 1984, Pat. No. 4,559,315, which is a continuation-in-part of Ser. No. 465,987, Feb. 14, 1983, Pat. No. 4,513,091, said Ser. No. 724,370, is a continuation-in-part of Ser. No. 555,118, Nov. 25, 1983, Pat. No. 4,550,092, which is a division of Ser. No. 317,037, Nov. 21, 1981, Pat. No. 4,435,516. This application Feb. 25, 1988, Ser. No. 163,191

Int. Cl.[4] B01J *29/28*

U.S. Cl. 502—71 **9 Claims**

1. A method for modifying a calcined unbound porous crystalline high silica content inorganic solid comprising a calcined aluminosilicate having a silica to alumina ratio of at least about 70 and having a predetermined ion-exchange capacity after calcining, said solid being further characterized by the presence of extractable silica, which method comprises:

contacting in the absence of added organic nitrogen, organic phosphorus compound, or activating metal oxide, said porous solid with liquid water containing alkali metal cation, and anions selected from the group consisting of carbonate and nitrate, at a pH from about 7 to 12 and for from less than about one hour to 100 hours at a temperature up to 370° C.;

and recovering a crystalline solid having an ion-exchange capacity greater than said porous crystalline high silica-content inorganic solid.

4,876,229

CATALYST COMPOSITION FOR POLYMERIZING OLEFINS OF NARROW MOLECULAR WEIGHT DISTRIBUTION AND POLYMERIZATION THEREWITH

Allan B. Furtek, Warren, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 31, 1988, Ser. No. 200,403

Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—107 **62 Claims**

1. In a process of preparing a supported olefin polymerization catalyst composition comprising a transition metal or a compound thereof and a catalyst activator, an improvement comprising using such a support that the catalyst composition has an average pore diameter of about 20 to about 300 Angstroms at a substantially constant particle size, so that the span

of the particle size distribution of the catalyst is less than about 0.5.

4,876,230

MAGNESIUM ALKOXIDE POLYMERIZATION CATALYST BY BOILING IN ORGANIC SOLVENTS

Robert C. Job, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 6, 1988, Ser. No. 240,600
Int. Cl.[4] C08F 4/64
U.S. Cl. 502—171 6 Claims

1. A process for improving the morphology and/or productivity of a polymerization catalyst formed from a magnesium alkoxide with bound alcohol, which comprises treating said magnesium alkoxide with an unreactive solvent at or above the temperature at which the alcohol dissociates from the alkoxide prior to subjecting said magnesium alkoxide to metathesis.

4,876,231

PROCESS FOR PREPARING CRYSTALLINE MALACHITE

Joseph M. Fremont, Glen Mills, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 7, 1988, Ser. No. 241,263
Int. Cl.[4] B01J 27/232, 35/08
U.S. Cl. 502—174 6 Claims

1. In a process for preparing agglomerates of spheroidal masses of malachite crystals, which crystals comprise 1–7%, by weight, of bismuth oxycarbonate and 0.5–3.5%, by weight (calculated as SiO_2), of silicic acid from a copper salt, a bismuth salt, and silicic acid, in which the process comprises:

(a) forming amorphous gel-like hydrated copper carbonate by bringing together, in aqueous solution, with agitation, at a temperature of about 45°–55° C. and at a pH of 5.5–7.5, maintained with an alkali metal carbonate or an alkali metal bicarbonate, about 30–60% by volume of the total amount of the copper salt, the bismuth salt and the silicic acid required to form the malachite and to provide the specified amounts of bismuth oxycarbonate and silicic acid;

(b) holding the mass of (a) without agitation at a temperature of about 45°–55° C. until masses of malachite crystals form; and then

(c) maintaining the resulting slurry at a temperature of 45°–55° C. and at a pH of 5.5–7.5 with an alkali metal carbonate or an alkali metal bicarbonate while adding, with agitation, the remainder of the required amount of copper salt, bismuth salt and salicic acid to form the agglomerates, the improvement comprising:

(1) substituting an alkali metal silicate for silicic acid in step (a), and dividing the starting materials into a first ingredient stream comprising a mixture of the alkali metal silicate and the carbonate or the bicarbonate, and a second ingredient stream comprising the copper salt and the bismuth salt; and

(2) in step (c), adding the remaining starting materials to the slurry of step (b) by first mixing the ingredient streams to achieve a pH in the range of 5.5–7.5 and then adding the mixture to the slurry.

4,876,232

SUPPORTED HETEROPOLYCYCLIC COMPOUNDS IN THE SEPARATION AND REMOVAL OF LATE TRANSITION METALS

Aaron Barkatt, Silver Spring, Md., assignor to Pedro B. Macedo, Bethesda and Theodore A. Litovitz, Annapolis, both of, Md.

Filed Sep. 28, 1987, Ser. No. 101,920
Int. Cl.[4] B01J 20/20, 20/22; C01G 55/00; C02F 1/42
U.S. Cl. 502—417 2 Claims

1. A composition comprising an activated carbon or charcoal porous support having interconnected pores, and characterized in that its internal surface contains a phenanthroline moiety in a concentration of at least about 0.1% by dry weight relative to said support.

4,876,233

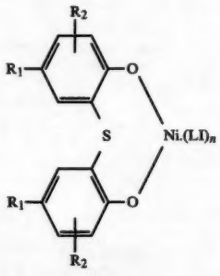
RECORDING MATERIAL

Keiso Saeki; Shojiro Sano; Katsumi Matsuoka; Masanobu Takashima, and Ken Iwakura, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 158,468, Feb. 22, 1988, abandoned. This application Dec. 15, 1988, Ser. No. 287,524
Claims priority, application Japan, Feb. 20, 1987, 62-37404; Mar. 13, 1987, 62-58514
Int. Cl.[4] B41M 5/16, 5/18
U.S. Cl. 503—209 10 Claims

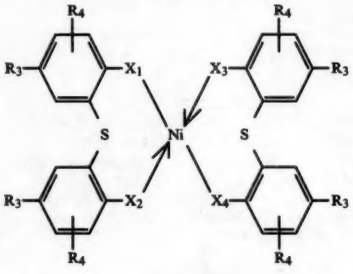
1. A recording material comprising a support having provided thereon a color developer and microcapsules containing a substantially colorless color former, wherein said microcapsules further contain at least one of nickel compounds represented by formula (I)

(I)



wherein R_1 and R_2 each represent a hydrogen atom, an alkyl group, an alkoxy group, an aryloxy group, an aryl group, a halogen atom, a cyano group or a nitro group; LI represents an organic ligand which is bonded to the nickel ion via a hetero atom to form a complex; and n represents 0, 1 or 2,
and nickel compounds represented by formula (II)

(II)



wherein R_3 and R_4 each represents a hydrogen atom, an alkyl group, an alkoxy group, an aryloxy group, an aryl group or a halogen atom; X_1 and X_4 each represents an oxygen atom or a sulfur atom; and X_2 and X_3 each represents a hydroxyl group or a mercapto group.

4,876,234

THERMALLY-TRANSFERABLE FLUORESCENT OXAZOLES

Richard P. Henzel, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1988, Ser. No. 238,655
Int. Cl.[4] B41M 5/035, 5/26
U.S. Cl. 503—227 18 Claims

7. In a process of forming a transfer image comprising imagewise-heating a donor element comprising a support having on one side thereof a layer comprising a material dispersed in a polymeric binder, and on the other side thereof a slipping layer comprising a lubricant, and transferring an image to a receiving element to form said transfer image, the improvement wherein said material is a fluorescent oxazole compound.

4,876,235

DYE-RECEIVING ELEMENT CONTAINING SPACER BEADS IN A LASER-INDUCED THERMAL DYE TRANSFER

Charles D. DeBoer, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 12, 1988, Ser. No. 282,706
Int. Cl.[4] B41M 5/035, 5/26
U.S. Cl. 503—227 20 Claims

8. In a process of forming a laser-induced thermal dye transfer image comprising

(a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material, and

(b) transferring a dye image to a dye-receiving layer of a dye-receiving element to form said laser-induced thermal dye transfer image, the improvement wherein said dye-receiving element comprises a support having thereon spacer beads of such particle size and concentration that effective contact between said dye-receiving element and said dye-donor element is prevented during transfer of said laser-induced thermal dye transfer image, said spacer beads being located either in said dye-receiving layer or in a layer thereover.

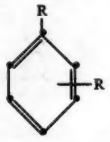
4,876,236

MATERIAL FOR INCREASING DYE TRANSFER EFFICIENCY IN DYE-DONOR ELEMENTS USED IN THERMAL DYE TRANSFER

Noel R. Vanier, Rochester, and Kin K. Lum, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 129,037, Dec. 4, 1987, abandoned. This application Jul. 19, 1988, Ser. No. 221,151
Int. Cl.[4] B41M 5/035, 5/26
U.S. Cl. 503—227 20 Claims

8. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having on one side thereof a dye layer comprising a dye dispersed in a polymeric binder and transferring a dye image to a dye-receiving element to form said dye transfer image, the improvement wherein said polymeric binder comprises a mixed cellulose ester and said dye-donor element contains a colorless, nonpolymeric material for increasing dye transfer efficiency having the following formula:



wherein both R groups represent $—CO_2J$ or $—O_2CJ$ and are located either ortho or meta to each other; and each J independently represents a substituted or unsubstituted phenyl group, or a substituted or unsubstituted carbomonocyclic or carbobicyclic ring having from 5 to about 12 carbon atoms, with the proviso that when either or both of J is substituted, then the total number of substituent carbon atoms in each J group is 8 or less.

4,876,237

THERMALLY-TRANSFERABLE FLUORESCENT 7-AMINOCOUMARINS

Gary W. Byers, and Derek D. Chapman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1988, Ser. No. 238,653
Int. Cl.[4] B41M 5/035, 5/26
U.S. Cl. 503—227 15 Claims

8. In a process of forming a transfer image comprising imagewise-heating a donor element comprising a support having on one side thereof a layer comprising a material dispersed in a polymeric binder, and on the other side thereof a slipping layer comprising a lubricant, and transferring an image to a receiving element to form said transfer image, the improvement wherein said material is a fluorescent 7-aminocoumarin compound.

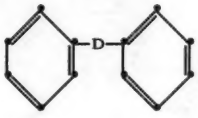
4,876,238

INCREASING DYE TRANSFER EFFICIENT IN DYE-DONOR ELEMENTS USED IN THERMAL DYE TRANSFER

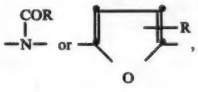
Noel R. Vanier, Rochester, and Kin K. Lum, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 129,037, Dec. 4, 1987, abandoned. This application Jul. 19, 1988, Ser. No. 221,150
Int. Cl.[4] B41M 5/035, 5/26
U.S. Cl. 503—227 20 Claims

8. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having on one side thereof a dye layer comprising a dye dispersed in a polymeric binder and transferring a dye image to a dye-receiving element to form said dye transfer image, the improvement wherein said dye-donor element contains a colorless, nonpolymeric material for increasing dye transfer efficiency having the following formula:



wherein D is —CO—, $—SO_2NR—$, —CONR—, —C—CHR—CO—,



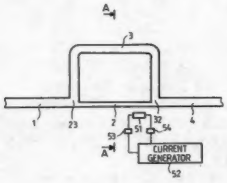
wherein R is H or a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms.

4,876,239

MICROWAVE SWITCH HAVING MAGNETICALLY BIASED SUPERCONDUCTIVE CONDUCTORS

Gérard Cachier, Bures sur Yvette, France, assignor to Thomson-CSF, Puteaux, France

Filed Mar. 13, 1989, Ser. No. 322,578
Claims priority, application France, Mar. 18, 1988, 88 03525
Int. Cl.[4] H01P *1/10*
U.S. Cl. 505—1 8 Claims



1. A microwave switch comprising:

a first microwave line section;

a bifurcaton of the first section into a first microwave line arm and a second microwave line arm,

a rejoining of the two arms in a second microwave line section;

phase-shifting means to place the signals, transmitted in each of the two arms and recombined at said rejoining point, in phase opposition; said phase-shifting means consisting of the first arm and of the second arm, the respective lengths of these two arms differing by a quantity which is substantially equal to an odd number of half wavelengths of operation of the switch, at least one of the two arms being capable of going reversibly from a normal state to a superconductive state at a critical temperature the impedances of these arms providing for a division of the power into two substanially equal parts at the position of the bifurcaiion when both arms are in the same state,

control means to control the phase-shifting means; said conirol means governing the state of at least one of the two arms, an identity and a difference of state between the two arms providing respectivey for the opening and closing of the switch.

4,876,240

PROCESSES FOR THE PREPARATION OF COPPER OXIDE SUPERCONDUCTORS

Ronald F. Ziolo, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 2, 1988, Ser. No. 188,889
Int. Cl.[4] C01G *3/02*
U.S. Cl. 505—1 20 Claims

1. A process for the preparation of copper oxide superconductors which comprises (1) mixing stochiometric amounts of copper nitride, an oxidizing agent, and yttrium oxide; (2) forming pellets of the aforementioned mixture; (3) heating the pellets; and (4) thereafter cooling said pellets.

4,876,241

STABILIZATION OF BIOLOGICAL AND PHARMACEUTICAL PRODUCTS DURING THERMAL INACTIVATION OF VIRAL AND BACTERIAL CONTAMINANTS

Fred Feldman, Park Forest; Mark S. Kiekamp, Bourbonnais, both of Ill.; Michael E. Hrinda, Gwynedd Valley; Arthur B. Shaw, Audubon, both of Pa., and Sudhish Chandra, Kankakee, Ill., assignors to Armour Pharmaceutical Company, Fort Washington, Pa.

Continuation-in-part of Ser. No. 52,926, May 22, 1987. This application May 18, 1988, Ser. No. 195,318
Int. Cl.[4] A61K *37/02*
U.S. Cl. 514—2 32 Claims

1. A method of inactivating pathogens in a proteinaceous biological or a proteinaceous pharmaceutical product comprising the steps of:

mixing said product in an aqueous solution containing at least one primary stabilizer selected from the group consisting of sugars and sugar alcohols and at least one secondary stabilizer selected from the group consisting of neutral salts;

adjusting the pH of said aqueous solution to about 5.0 to 10.0;

subjecting said aqueous solution to a pathogen inactivating process; and

optionally removing said primary and secondary stabilizers from said aqueous solution.

4,876,242

HUMAN INSULIN-LIKE GROWTH FACTOR ANALOGES WITH REDUCED BINDING TO SERUM CARRIER PROTEINS AND THEIR PRODUCTION IN YEAST

Joy D. Applebaum, North Brunswick; Marvin L. Bayne, Westfield, and Margaret A. Cascieri, East Windsor, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 21, 1987, Ser. No. 99,367
Int. Cl.[4] A61K *37/26;* C07K *7/10, 7/40*
U.S. Cl. 514—3 13 Claims

1. A synthetic polypeptide analog of hIGF-I which has the structure:

$$A_1\text{-}A_2\text{-}A_3\text{-}A_4\text{-LCG-}A_5\text{-}A_6\text{-LV-}A_7\text{AL-}A_8\text{-}A_9\text{-}R_1$$

wherein:

A_1 is G, V, or FV;

A_2 is P or N;

A_3 is E or Q;

A_4 is T, H or A;

A_5 is A or S;

A_6 is E or H;

A_7 is D or E;

A_8 is Q or Y;

A_9 is F or L; and

R_1 is VCGDRGFYFNKPTGYGSSSRRAPQTGIVDECCFRSCDLRRLEMYCAPLKPAKSA provided that the A_1 to A_9 groups and R_1 do not constitute GPETLCGAELVDALQF-R_1.

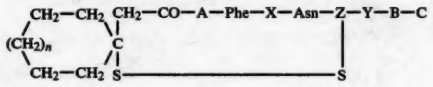
4,876,243

VASOPRESSIN COMPOUNDS

Garland R. Marshall, Clayton, Mo., and Michael L. Moore, Media, Pa., assignors to Smithkline Beckman Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 832,805, Feb. 25, 1986. This application Aug. 27, 1987, Ser. No. 89,886
Int. Cl.[4] A61K *37/34;* C07K *7/16*
U.S. Cl. 514—11 14 Claims

1. A chemical compound having the formula:



in which:

Z is a D or L-isomer of Cys;

X is Val, Chg, Gln, Cha, Phe, Lys or α-MeAA;

Y is a D or L-isomer of Pro, Arg, HArg or MeArg, a single bond or α-MeAA, α-MePro, α-MeLys or α-MeArg; at least one of X and Y being a said α-Me amino acid group;

A is a D or L-isomer of Tyr, Tyr(Alk), Phe or 4'-AlkPhe;

B is a D or L-isomer of Arg MeArg or HArg or, when C is Cad, a single bond;

C is Gly, Gly(NH_2), Cad, OH or NH_2; and

n is 0 or 1, or a pharmaceutically acceptable salt or ester prodrug thereof.

4,876,244

MEDICAL COMPOSITION FOR INJECTION CONTAINING A SPERGUALIN AS ACTIVE INGREDIENT AND PROCESS FOR PREPARING THE SAME

Hamao Umezawa; Shintaro Suzuki; Taka'aki Ohkuma; Fumihiro Sato, all of Tokyo, and Teruya Nakamura, Kusatsu, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku, Tokyo, Japan

Division of Ser. No. 817,266, Jan. 9, 1986, Pat. No. 4,710,517. This application Aug. 11, 1987, Ser. No. 84,167

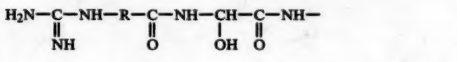
Claims priority, application Japan, Jan. 14, 1985, 60-3351

Int. Cl.[4] A61K *37/02*

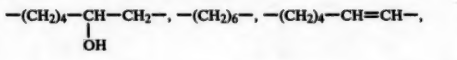
U.S. Cl. 514—19 **14 Claims**

1. A freeze dried composition for injection containing

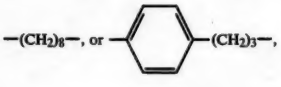
(1) a compound of the formula:



or a salt thereof, wherein R is



(wherein R' is a lower alkyl group having 1 to 4 carbon atoms),



and

(2) at least one stabilizer selected from the group consisting of dextran, cyclodextrin, and chondroitin sulfate.

4,876,245

FLUORINE-CONTAINING MACROLIDE COMPOUNDS AND THEIR USE

Yorisato Hisanaga, Ibaraki; Kazuhiro Shimokawa, Settsu; Toshihiko Kawano, Ohtsu; Yasunori Suita, Matsubara, and Tsuneo Yamashita, Settsu, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

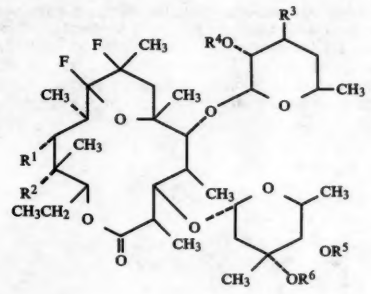
Filed Dec. 21, 1987, Ser. No. 136,125

Claims priority, application Japan, Dec. 22, 1986, 61-307132

Int. Cl.[4] A61K *31/70*; C07H *17/08*

U.S. Cl. 514—29 **2 Claims**

2. An antimicrobial composition comprising, an effective amount of a fluorine-containing macrolide compound of the formula:



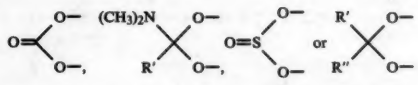
(I)

wherein

R^1 is hydroxy or —OR (wherein R is C_1–C_5 alkyl),

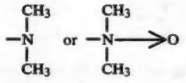
R^2 is hydrogen or hydroxy, or

R^1 and R^2 together form a cyclic residue of the formula:



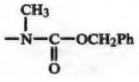
(wherein R' and R'' are independently hydrogen or C_1–C_5 alkyl),

R^3 is



when R^4 is hydrogen or C_1–C_5 alkyl, or

R^3 is



when R^4 is

(wherein Ph is phenyl),

R^5 is hydrogen or C_1–C_5 alkyl, and

R^6 is hydrogen or methyl and a pharmaceutically acceptable carrier.

4,876,246

BENZO[A]PHENOTHIAZINES AND HYDRO-DERIVATIVES FOR INHIBITING LEUKOTRIENE BIOSYNTHESIS

Yvan Guindon, Closse Ile Bizard; Yves Girard; Cheuk K. Lau, both of Pierrefonds; Rejean Fortin, Montreal; Joshua Rokach, Laval, and Christiane Yoakim, Montreal, all of Canada, assignors to Merck Frosst Canada, Inc., Kirkland, Canada

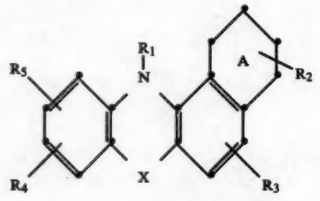
Continuation of Ser. No. 871,342, Jun. 6, 1986, abandoned, which is a division of Ser. No. 716,878, Mar. 28, 1985, Pat. No. 4,611,056, which is a continuation-in-part of Ser. No. 654,994, Sep. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 539,215, Oct. 5, 1983, abandoned. This application Apr. 20, 1988, Ser. No. 183,944

Int. Cl.[4] A61K *31/54, 31/535, 31/675*

U.S. Cl. 514—80 14 Claims

1. A pharmaceutical composition for inhibiting leukotriene biosynthesis or action in mammals, which is atablet, elixir, emulsion, injectable solution, capsule, aerosol spray, controlled release patch, thixotropic formulation, powder, suppository, cachet, or injectable suspension, containing a pharmaceutically-acceptable carrier and an effective amount of a compound having the formula (I):

(I)

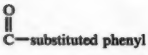


wherein:

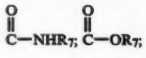
X is O, S, SO or SO_2;

R_1 is H; C_1 to C_6-alkyl; C_1 to C_6-acyl; C_1 to C_6-aminoacyl; C_1 to C_6-acyloxy-C_1 to C_6-alkyl; C_1 to C_6-alkoxy-C_1 to C_6-alkyl;

or



wherein the substituents of substituted phenyl are as defined below among the definitions of R_{15}; carbamoyl;



SO_2—C_6H_4-p—CH_3; SO_2CH_3; or R_1 is an acyl group, such that R_1—OH is an essential amino acid;

R_2, R_3, R_4 and R_5, all of which may be positioned anywhere on the structure, are independently selected from:

(1) hydrogen;

(2) alkyl having 1 to 6 carbon atoms;

(3) alkenyl having 2 to 6 carbon atoms;

(4) —$(CH_2)_n$M, wherein n is 0 to 6 and M is

(a) OR_{15}, where R_{15} is as defined below;

(b) F, Cl, Br or I;

(c) CF_3;

(d) SR_{15} where R_{15} is H; C_1 to C_6-alkoxy-C_1 to C_6-alkyl; C_1 to C_6-acyloxy-C_1 to C_6-alkyl; C_1 to C_6-alkyl; benzyl; —$(CH_2)_n$$COOR_6$, wherein n is 0 to 6; CN; formyl; C_1 to C_4-perfluoroalkyl; CH_2—R_{12}, wherein R_{12} is C_1 to C_5-alkyldimethylamino or phenyl; phenyl; substituted phenyl, wherein the substituents are C_1 to C_3-alkyl, Cl, F, Br, I, CN, CF_3, $COOR_6$, CH_2COOR_6, $(CH_2)_pNR_8R_9$ where p is 0 to 2, C_1 to C_3-alkoxy or OH;

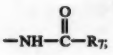
(e) phenyl or substituted phenyl, wherein substituted phenyl is as defined in the definition of R_{15};

(f) $COOR_6$;

(g)

(h) tetrazole;

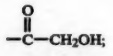
(i)



(j) —NR_8R_9;

(k) —$NHSO_2R_{10}$ wherein R_{10} is OH, C_1 to C_6-alkyl, C_1 to C_6-alkoxy, or phenyl;

(l)



(m) —SOR_{11} wherein R_{11} is C_1 to C_6-alkyl; phenyl; substituted phenyl, where substituted phenyl is as defined in the definition of R_{15}; $(CH_2)_mCOOR_6$ wherein m is 1 to 6; CN; formyl or perfluoro-C_1 to C_4-alkyl;

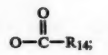
(n) —$CONR_8R_9$;

(o) —$SO_2NR_8R_9$;

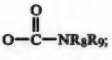
(p) —$SO2R_{13}$, wherein R_{13} is OH; C_1 to C_6-alkyl; H; phenyl; substituted phenyl, wherein substituted phenyl is as defined in the definition of R_{15}; $(CH_2)_mCOOR_6$ wherein m is 1 to 6; CN; formyl or perfluoro-C_1 to C_4-alkyl;

(q) NO_2;

(r)



(s)

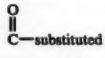


(t) —CN;

(u) —$OPO(OR_6)_2$; or

(v) —OR_a, wherein R_a is H; C_1 to C_5-alkyl; C_1 to C_5-acyl; C_1 to C_6-alkoxy-C_1 to C_6-alkyl; C_1 to C_6-acyloxy-C_1 to C_6-alkyl; C_1 to C_4-aminoacyl; carbamoyl;

or



wherein substituted phenyl is as defined in the definition of R_{15};

where R_c is C_1 to C_4-alkyl;

where R_d is C_1 to C_4-alkyl or C_1 to C_6-acyloxy-C_1 to C_6-alkyl; or is a structure such that $-OR_d$ is an ester of an essential amino acid; and

(5) $-(CHR_6)_qCOOR_6$, where q is 0 to 4; where each R_6 is independently H, phenyl or C_1 to C_6-alkyl; each R_7 is C_1 to C_6-alkyl, benzyl, phenyl or C_1 to C_6-acyloxy-C_1 to C_6-alkyl; each R_8 and each R_9 is independently H, phenyl or substituted phenyl, where substituted phenyl is as defined in the definition of R_{15}, or C_1 to C_4-alkyl; each R_{14} is independently H, $(CH_2)_qCOOR_6$ wherein q is 0 to 4, C_1 to C_6-alkyl, C_1 to C_6-alkoxy, C_1 to C_6-acyloxy-C_1 to C_6-alkoxy, phenyl or substituted phenyl wherein substituted phenyl is as defined in the definition of R_{15}, C_1 to C_6-aminoalkyl, or R_{14} is such that $R_{14}CO_2H$ is an essential amino acid; and | represents single or double bonds; and pharmaceutically-acceptable salts thereof.

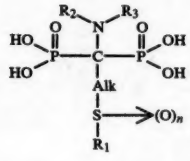
4,876,247

METHLENEDIPHOSPHONIC ACID DERIVATIVES, AND ANTIRHEUMATIC PHARMACEUTICAL COMPOSITION IN WHICH THEY ARE PRESENT AND METHODS OF USING SAME

Alain Barbier, St-Clement la Riviere; Jean-C aude Breliere, Montpellier, and Georges Garcia, St-Gely-du-Fesc, all of France, assignors to Sanofi, Paris, France

Continuation of Ser. No. 919,571, Oct. 15, 1986, abandoned, which is a continuation of Ser. No. 691,893, Jan. 16, 1985, abandoned. This application Oct. 30, 1987, Ser. No. 115,615
Claims priority, application France, Jan. 26, 1984, 8401214
Int. Cl.[4] C07F *9/38, 9/58, 9/65;* **A61K** *31/44*
U.S. Cl. 514—89 **8 Claims**

1. A methylenediphosphonic acid derivative of the formula:



wherein:

R_1 represents C_5–C_7 cycloalkyl, phenyl unsubstituted or monosubstituted or polysubstituted by a member selected from amongst halogen, C_1–C_6 alkyl or trifluoromethyl; or pyridyl

Alk denotes linear or branched C_1–C_6 alkylene;

R_2 represents hydrogen, C_1–C_6 alkyl or $—CONH_2$;

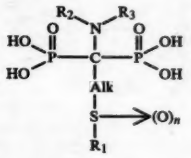
R_3 represents hydrogen, C_1–C_6 alkyl, benzyl or phenyl unsubstituted or substituted by a member selected from amongst chlorine or methyl;

R_2 and R_3, taken together, represent $(CH_2)_m$, in which m is 4 or 5; and

n is 0, 1 or 2;

and salts thereof with pharmaceutically acceptable inorganic or organic bases.

4. A method for the treatment of rheumatism or rheumatoid polyarthritis which comprises administering to an animal in need thereof an antirheumatic effective amount of methylenediphosphonic acid derivative of the formula:



wherein:

R_1 represents C_1–C_6 alkyl or C_5–C_7 cycloalkyl; or R_1 represents phenyl unsubstituted or monosubstituted or polysubstituted by halogen, C_1–C_6 alkyl or trifluoromethyl, or pyridal;

Alk denotes linear or branched C_1–C_6 alkylene;

R_2 represents hydrogen, C_1–C_6 alkyl or $—CONH_2$;

R_3 represents hydrogen, C_1–C_6 alkyl, benzyl or phenyl unsubstituted or substituted by a member selected from amongst chlorine or methyl;

R_2 and R_3, taken together, represents $(CH_2)_m$, in which m is 4 or 5; and

n is 0, 1 or 2;

and salts thereof with pharmaceutically acceptable inorganic or organic bases.

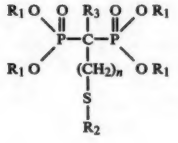
4,876,248

ANTI-INFLAMMATORY PRODUCTS DERIVED FROM METHYLENE-DIPHOSPHONIC ACID, AND PROCESS FOR THEIR PREPARATION

Jean C. Breliere; Xâvier Emonds-Alt, both of Montpellier, and Georges Garcia, Saint-Gely-du-Fesc, all of France, assignors to Sanofi, Paris, France

Division of Ser. No. 858,573, Apr. 24, 1986, Pat. No. 4,746,654, which is a continuation of Ser. No. 518,427, Jul. 29, 1983, abandoned. This application Mar. 7, 1988, Ser. No. 165,080
Claims priority, application France, Jul. 29, 1982, 82 13250
Int. Cl.[4] A61K *31/66;* **C07F** *9/38*
U.S. Cl. 514—108 **5 Claims**

1. A methylene-diphosphonic acid compound having the formula:



(I)

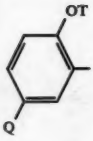
in which:

R_1 is hydrogen or a straight or branched lower alkyl group having from 1 to 4 carbon atoms,

R_2 is a phenyl group which is or substituted one or more times by halogen, a nitro group, a lower alkyl group, a lower alkoxy group, trifluoromethyl, an NH_2 group, a COOH group;

R_3 is hydrogen or a hydroxyl group; and

n is an integer between 0 and 10, with the proviso that n cannot be 0 if R_3 is OH, and with the further proviso that: R_2 is different from the group having the formula



wherein Q is a halogen atom, a nitro group or a trifluoromethyl group and T is methyl, ethyl or butyl when . R_1 is a methyl or ethyl group, R_3 is hydrogen and n=0; and the salts of said compounds with inorganic or organic bases when R_1=H.

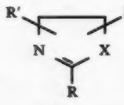
4,876,249

COMPOSITIONS AND METHOD COMPRISING HETEROCYCLIC COMPOUNDS CONTAINING TWO HETEROATOMS

Vithal J. Rajadhyaksha, 27436 Esquina, Mission Viejo, Calif. 92691

Filed Jan. 12, 1987, Ser. No. 2,387
Int. Cl.[4] A61K *31/58*
U.S. Cl. 514—174 **11 Claims**

1. The method for topically administering fluocinolone acetonide to the skin of humans and animals for localized use comprising applying to such skin or membrane a mixture of fluocinolone acetonide and a amount of penetration enhancing compound having the structural formula:



I

wherein: R is a saturated or unsaturated hydrocarbon group with from 5 to 19 carbon atoms; R′ and R″ are hydrogen, lower alkyl, trifluoromethyl, lower hydroxyalkyl or lower alkyl ester of lower hydroxyalkyl, with the proviso that both R′ and R″ are not lower hydroxyalkyl; X is O or NR; R, being hydrogen, lower alkyl, lower alkenyl, lower hydroxyalkyl or lower alky ester of lower hydroxyalkyl.

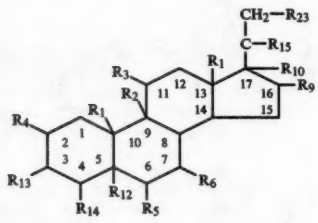
4,876,250

METHODS FOR CONTROLLING OCULAR HYPERTENSION WITH ANGIOSTATIC STEROIDS

Abbot F. Clark, Arlington, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.

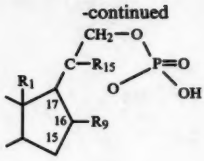
Filed Oct. 31, 1988, Ser. No. 264,918
Int. Cl.[4] A61K *31/56, 31/58*
U.S. Cl. 514—179 **6 Claims**

1. A method for controlling ocular hypertension associated with primary open angle glaucoma, which comprises:
administering a therapeutically effective amount of an angiostatic steroid having the formula:



I

-continued



II

wherein
R_1 is β—CH_3 or β—CH_2H_5;
R_2 is H or —Cl;
R_3 is H, =O, —OH, —O—alkyl(C_1–C_{12}), —OC (=O)alkyl(C_1–C_{12}), —OC(=O)ARYL, —OC(=O)N($R)_2$ or α—OC(=O)OR_7, wherein ARYL is furyl, thienyl, pyrrolyl, or pyridyl and each of said moieties is optionally substituted with one or two (C_1–C_4)alkyl groups, or
ARYL is —$(CH_2)_f$-phenyl wherein f is 0 to 2 and the phenyl ring is optionally substituted with 1 to 3 groups selected from chlorine, fluorine, bromine, alkyl(C_1–C_3), alkoxy(C_1–C_3), thioalkoxy-(C_1–C_3), Cl_3C—, F_3C—, —NH_2 and —$NHCOCH_3$ and R is hydrogen, alkyl (C_1–C_4), or phenyl and each R can be the same or different, and R_7 is ARYL as herein defined, or alkyl(C_1–C_{12}); or
wherein
R_2 and R_3 taken together are oxygen (—O—) bridging positions C-9 and C-11; or
wherein
R_2 and R_3 taken together form a double bond between positions C-9 and C-11; or
R_2 is α—F and R_3 is β—OH; or
R_2 is α—Cl and R_3 is β—Cl; and
R_4 is H; CH_3, Cl or F;
R_5 is H, OH, F, Cl, Br, CH_3, phenyl, vinyl or allyl;
R_6 is H or CH_3; R_9 is H, OH, CH_3, F or =CH_2;
R_{10} is H, OH, CH_3 or R_{10} forms a second bond between positions C-16 and C-17;
R_{12} is —H or forms a double bond with R_{14};
R_{13} is H, —OH, =O, —O—P(O)$(OH)_2$, or —O—C(=O)—$(CH_2)_t$COOH where t is an integer from 2 to 6;
R_{14} is H or forms a double bond with R_{12};
R_{15} is =O or —OH; and
R_{23} with R_{10} forms a cyclic phosphate as depicted by Formula II;
wherein
R_9 and R_{15} have the meaning defined above; or
wherein
R_{23} is —OH, O—C(=O)—R_{11}, —OP(O)—$(OH)_2$, or —O—C(=O)—$(CH_2)_t$COOH wherein t is an integer from 2 to 6; and R_{11} is —Y—$(CH_2)_n$—X—$(CH_2)_m$—SO_3H, —Y′—(CH_2)p—X′—$(CH_2)_q$—$NR_{16}R_{17}$ or —$Z(CH_2)_rQ$, wherein Y is a bond or —O—; Y′ is a bond, —O—, or —S—; each of X and X′ is a bond, —CON(R_{18})—, —N(R_{18})CO—, —O—, —S—, —S(O)—, or —S(O_2)—; R_{18} is hydrogen or alkyl (C_1–C_4); each of R_{16} and R_{17} is a lower alkyl group of from 1 to 4 carbon atoms optionally substituted with one hydroxyl or R_{16} and R_{17} taken together with the nitrogen atom to which each is attached forms a monocyclic heterocyclic selected from pyrrolidino, piperidino, morpholino, thiomorpholino, piperazino or N(lower)alkyl-piperazino wherein alkyl has from 1 to 4 carbon atoms; n is an integer of from 4 to 9; m is an integer of from 1 to 5; p is an integer of from 2 to 9; q is an integer of from 1 to 5;
Z is a bond or —O—; r is an integer of from 2 to 9; and Q is one of the following:
(1) —R_{19}—CH_2COOH wherein R_{19} is —S—, —S(O)—, —$S(O)_2$—, —SO_2N(R_{20})—, or N(R_{20})SO_2—; and R_{20} is hydrogen or lower alkyl—(C_1–C_4); with the proviso that the total number of carbon atoms in R_{20} and $(CH_2)_r$ is not greater than 10; or
(2) —CO—COOH; or
(3) CON(R_{21})CH(R_{22})COOH wherein R_{21} is H and R_{22} is

H, CH_3, $—CH_2COOH$, $—CH_2CH_2COOH$, $—CH_2OH$, $—CH_2SH$, $—CH_2CH_2SCH_3$, or $—CH_2Ph—OH$ (wherein Ph—OH is p-hydroxyphenyl); or R_{21} is CH_3 and R_{22} is H; or R_{21} and R_{22} taken together are $—CH_2CH_2CH_2—$; or $—N(R_{21})CH(R_{22})COOH$ taken together is $—NHCH_2CONHCH_2COOH$; and pharmaceutically acceptable salts thereof; with the proviso that except for the compound wherein R_1 is $—CH_3$, R_2 and R_3 taken together form a double bond between positions 9 and 11, R_4 and R_6 are hydrogen, R_{12} and R_{14} taken together form a double bond between positions 4 and 5, R_5 is α—F, R_9 is β—CH_3, R_{10} is α—OH, R_{13} and R_{15} are =O and R_{23} is $—OP(O)—(OH)_2$, R_{13} is =O only when R_{23} with R_{10} forms the above described cyclic phosphate and except the compounds wherein R_{15} is =O;

R_{10} is α OH; R_1 is CH_3; R_3 is β OH; R_2 is H;

R_4 is H; R_{13} is α or β OH; R_{14} is H;

R_{12} is α or β H; R_5 is H; R_6 is H; R_9 is H and R_{23} is OH.

4,876,251

TRICYCLIC PENAM COMPOUNDS, THEIR PRODUCTION AND THEIR USE

Akira Morimoto; Nobuo Choh, and Noriyoshi Noguchi, all of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd., Japan

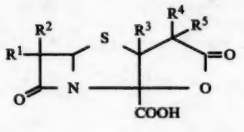
Filed Jun. 9, 1987, Ser. No. 59,951

Claims priority, application Japan, Jun. 17, 1986, 61-142257

Int. Cl.[4] A61K *31/43;* **C07D** *205/12, 499/82*

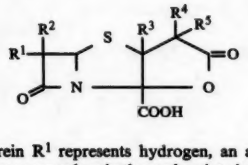
U.S. Cl. 514—193 **19 Claims**

1. A compound of the formula:



wherein R^1 represents hydrogen, an amino group, an acylamino group wherein the acyl moiety is derived from a carboxylic acid, or an alkyl which may be substituted by a hydroxy group; R^2 represents hydrogen, a methoxy group or a formylamino group and R^3, R^4 and R^5 independently represent hydrogen or an alkyl, its ester or its salt.

19. An antibacterial composition containing an antibacterially effective amount of a compound of the formula



wherein R^1 represents hydrogen, an amino group, an acylamino group wherein the acyl moiety is derived from a carboxylic acid, or an alkyl which may be substituted by hydroxy group; R^2 represents hydrogen, a methoxy group or a formylamino group and R^3, R^4 and R^5 independently represent hydrogen or an alkyl, its ester or its salt and a carrier.

4,876,252

4,5,6-SUBSTITUTED-N-(SUBSTITUTED-PHENYL)-2-PYRIMIDINAMINES

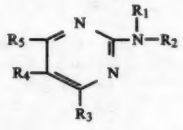
Lawrence W. Torley, Washingtonville; Bernard D. Johnson, Stony Point, and John P. Dusza, Nanuet, all of N.Y., assignors to American Cyanamid Company, Wayne, N.J.

Division of Ser. No. 927,572, Nov. 6, 1986, Pat. No. 4,788,195, which is a continuation-in-part of Ser. No. 817,951, Jan. 13, 1986, abandoned. This application May 17, 1988, Ser. No. 194,751

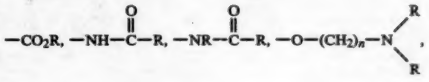
Int. Cl.[4] A61K *31/505*

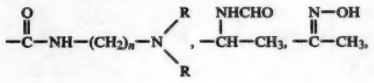
U.S. Cl. 514—224.8 **1 Claim**

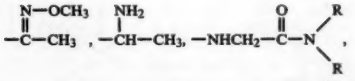
1. A method of treating asthma and allergic diseases in a mammal which comprises administering to said mammal an effective amount of a compound selected from the group consisting of those of the formula:

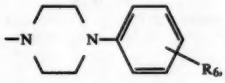


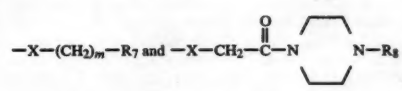
wherein R_1 is hydrogen, alkyl(C_1–C_3), $—COCO_2C_2H_5$ or N, N-dimethylaminoethyl; R_2 is mono- or poly-substituted phenyl wherein the substituents are alkyl(C_1–C_6), alkoxy(C_1–C_3), chloro, bromo, monoalkyl(C_1–C_3)amino, dialkyl(C_1–C_3.)amino, alkyl(C_1–C_3)keto, propenyloxy, carboxyl, oxyacetic acid, oxyacetic acid ethyl ester, sulfanilamido, N,N-dialkyl(C_1–C_3)sulfanilamido, N-methylpiperazinyl, piperidinyl, 1H-imidazol-1-yl, 1H-triazol-1-yl, 1H-benzimidazol-2-yl, 1-naphthyl, cyclopentyl, 3,4-dimethylbenzyl or moieties of the formulae:











wherein R is alkyl(C_1–C_3), X is oxygen(—O—) or sulfur(—S—), m is 1–3, n is 2 or 3, R_6 is hydrogen, alkyl(C_1–C_3), alkoxy(C_1–C_3), chloro, bromo, iodo or trifluoromethyl, R_7 is 1H-imidazol-1-yl or morpholino and R_8 is alkyl(C_1–C_3), phenyl or monosubstituted phenyl wherein the substituents are alkyl(C_1–C_3), halogen or trifluoromethyl; R_3 is 2-pyridinyl, 3-pyridinyl, 2-methyl-3-pyridinyl, 4-methyl-3-pyridinyl, 2-furanyl, 5-methyl-2-furanyl, 2,5-dimethyl-3-furanyl, 2-thienyl, 3-thienyl, 5-methyl-2-thienyl, 2-phenothiazinyl, 4-pyrazinyl, 2-benzofuranyl, 2-(pyridine-N-oxide), 3-(pyridine-N-oxide), 4-(pyridine-N-oxide), 1H-indol-2-yl, 1H-indol-3-yl, 1-methyl-

1H-pyrrol-2-yl, 4-quinolinyl, 4-pyridinyl methyl iodide, dimethylaminophenyl or N-acteyl-N-methylaminophenyl; R_4 is hydrogen or alkyl(C_1–C_3); and R_5 is hydrogen or alkyl(C_1–C_3); and the pharmacologically acceptable acid-addition salts thereof.

4,876,253

TRISUBSTITUTED 1,3,5-TRIAZINE-2,4,6-TRIONES

Wolfgand Führer, Cologne; Engelbert Kühle, Bergisch Gladbach; Alfons Adler, Cologne, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

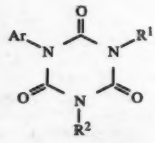
Continuation-in-part of Ser. No. 118,110, Nov. 5, 1987, which is a continuation-in-part of Ser. No. 50,981, May 15, 1987, abandoned. This application Apr. 18, 1988, Ser. No. 182,554

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1986, 3618662

Int. Cl.[4] C07D *251/34;* A01N *43/66*

U.S. Cl. 514—241 **11 Claims**

1. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a trisubstituted 1,3,5-triazine-2,4,6-trione of the formula



in which

Ar represents phenyl, which is optionally mono-, di-, tri-, tetra- or pentasubstituted by identical or different substituents from the group comprising halogen, alkyl with 1 to 4 carbon atoms, halogenoalkyl with 1 to 4 carbon atoms and 1 to 5 identical or different halogen atoms, alkoxy with 1 to 4 carbon atoms, halogenoalkoxy with 1 to 4 carbon atoms and 1 to 5 identical or different halogen atoms, alkythio with 1 to 4 carbon atoms, and halogenoalkylthio with 1 to 4 carbon atoms and 1 to 5 identical or different halogen atoms, or represents halogenosulphonyl, or represents dialkylamino with identical or different straight-chain or branched alkyl radicals with in each case 1 to 4 carbon atoms and nitro,

R^1 represents straight-chain or branched alkyl which has 1 to 12 carbon atoms and is optionally mono-or polysubstituted by identical or different substituents from the group comprising halogen, alkoxy with 1 to 3 carbon atoms, halogenoalkoxy with 1 to 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylthio with 1 to 3 carbon atoms, halogenoalkylthio with 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms and furyl and phenyl, which can likewise be mono-, di-, tri-, tetra- or pentasubstituted by identical or different halogen atoms; or represents cycloalkyl which has 3 to 8 carbon atoms and is optionally mono-, di-, tri-, tetra-, penta- or hexasubstituted by identical or different substituents from the group comprising halogen, alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 3 carbon atoms, halogenoalkoxy with 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylthio with 1 to 3 carbon atoms and halogenoalkylthio with 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, and

R^2 represents alkyl with 1 to 4 carbon atoms, alkenyl with 3 to 5 carbon atoms, alkinyl with 3 to 5 carbon atoms, alkoxyalkyl with in each case 1 to 3 carbon atoms in the alkoxy part and in the alkyl part, alkylthioalkyl with in each case 1 to 3 carbon atoms in the alkylthio part and in the alkyl part or alkoxycarbonylalkyl with 1 to 3 carbon atoms in the alkoxy part and 2 or 3 carbon atoms in the alkyl part, or represents cyanoalkyl with 1 to 5 carbon atoms in the alkyl part,

with the provisos that (a) when Ar is unsubstituted phenyl R^1 and R^2 are not alkyl or alkenyl, and (b) when Ar is phenyl substituted by 1 or 2 halogen, lower alkyl, nitro, lower alkoxycarbonyloxy or lower monoalkylcarbonyloxy radicals R^1 and R^2 are not identical alkyl radicals.

4,876,254

CIRCULATION-ACTIVE SUBSTITUTED 5-NITRO-1,4-DIHYDROPYRIDINES

Gerhard Franckowiak, Wuppertal; Michael Kayser, Leverkusen; Matthias Schramm, Cologne, all of Fed. Rep. of Germany; Günther Thomas, Arese, Italy; Rainer Gross, Wuppertal, Fed. Rep. of Germany; Elisabeth Perzborn, Wuppertal, Fed. Rep. of Germany, and Friedel Seuter, Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

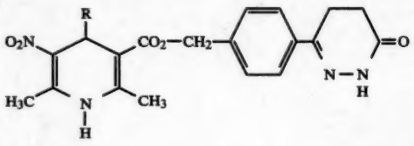
Filed Apr. 8, 1988, Ser. No. 179,102

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712260

Int. Cl.[4] C07D *401/12;* A61K *31/50*

U.S. Cl. 514—252 **13 Claims**

1. A 5-nitro-1,4-dihydropyridine of the formula



in which

R represents phenyl or naphthyl, which can be mono- to tetrasubstituted by identical or different substituents from the series comprising fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, trifluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio and benzyloxy or benzylthio optionally substituted by nitro, fluorine, chlorine, bromine, trifluoromethyl, methyl or methoxy, or

respresents a heterocycle from the series thienyl, furyl, pyridyl, pyrimidyl, quinolyl, benzoxadiazolyl or thiochromenyl, optionally mono- to trisubstituted by methyl, fluorine, chlorine, bromine or phenyl, or

represents straight-chain, branched or cyclic alkyl with up to 12 carbon atoms,

or a physiologically acceptable salt thereof.

4,876,255

SUBSTITUTED 1,4-DIHYDROPYRIDINES FOR CONTROL OF CIRCULATION AND THROMBOSES

Gerhard Franckowiak; Ulrich Rosentreter; Elisabeth Perzborn; Friedel Seuter, all of Wuppertal; Michael Kayser, Leverkusen, all of Fed. Rep. of Germany, and Günther Thomas, Arese, Italy, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

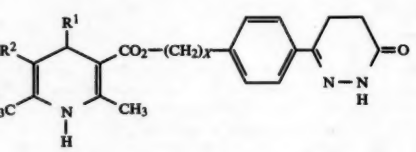
Filed Apr. 7, 1988, Ser. No. 178,710

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712371

Int. Cl.[4] C07D *401/12;* A61K *31/50*

U.S. Cl. 514—252 **12 Claims**

1. A 1,4-dihydropyridine of the formula



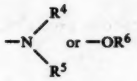
(I)

in which

R^1 represents phenyl or naphthyl, which may be mono- or independently di- or tri- substituted by fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, trifluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, benzylthio or benzyloxy which is optionally substituted by nitro, fluorine, chlorine, bromine, trifluoromethyl, methyl or methoxy, or represents an optionally methyl-, fluorine-, chlorine-, bromine- or phenylsubstituted heterocycle from the series thienyl, furyl, pyridyl, pyrimidyl, quinolyl, benzoxadiazolyl or thiochromenyl, or represents straight-chain or branced, optionally fluorine-, chlorine- bromineor pyridyl- substituted alkyl with up to 4 carbon atoms,

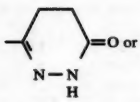
R^2 represents cyano or a group of the formula

wherein R^3 represents straight-chain, branched or cyclic alkyl with up to 6 carbon atoms, or represents a group of the formula



where

R^4 and R^5 are identical or different and represent hydrogen, C_1–C_4-alkyl or phenyl, and R^6 represents hydrogen or represents straight-chain or branched alkyl with up to 8 carbon atoms, which can be substituted by up to 7 fluorine atoms, or by chlorine, bromine, cyano, hydroxyl, C_1–C_6-alkoxy, pyridyl, phenoxy or by phenyl which is optionally substituted by fluorine, chlorine, bromine, nitro, cyano, trifluoromethyl, C_1–C_2-alkyl, C_1–C_2-alkoxy or a group of the formula



by a group of the formula

where

R^7 and R^8 are identical or different and represent hydrogen, C_1–C_4-alkyl, phenyl, benzyl or acetyl, or

R^7 and R^8 together form a 5-or 7-membered ring, which optionally contains sulphur or oxygen as a further hetero atom, and

X represents a number from 0 to 5, or a physiologically acceptable salt thereof.

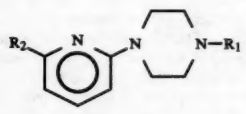
4,876,256

ALKYLPIPERAZINYLPYRIDINES AS HYPOGLYCEMIC AGENTS

Malcolm M. Coss, Freehold, and Richard L. Tolman, Warren, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 29, 1988, Ser. No. 188,246
Int. Cl.[4] A61K *31/495, 31/44;* C07D *401/04*
U.S. Cl. 514—252 **5 Claims**

1. A composition useful for the treatment of diabetes or obesity with associated insulin resistance which comprises a inert carrier and a therapeutically effective amount of a compound having the formula (I):



(I)

wherein:

R_1=C_{1-6}alkyl, C_{2-6}alkenyl, or C_{2-6}alkynyl;

R_2=H, C_{1-6}alkyl, C_{2-6}alkenyl, or C_{2-6}alkynyl.

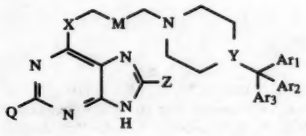
4,876,257

6-SUBSTITUTED PURINYL PIPERAZINE DERIVATIVES USEFUL AS CARDIOTONIC AND ANTIARRHYTHMIC AGENTS

Zoltan G. Hajos, Princeton; Ramesh M. Kanojia, Somerville, and Jeffery B. Press, Rocky Hill, all of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Mar. 3, 1988, Ser. No. 163,487
Int. Cl.[4] A61K *31/52;* C07D *473/02*
U.S. Cl. 514—253 **24 Claims**

1. A compound of the formula



wherein X is selected from S, O, NH, NR_1, wherein R_1 is C_{1-4}- lower alkyl;

M is selected from CH_2, CHOH, $CHOCOR_2$ and $CHOR_2$ wherein R_2 is selected from straight or branched chain C_1–C_8- lower alkyl, phenyl and substituted phenyl wherein the substituent is C_1–C_4- lower alkoxy, CF_3, halo and C_1–C_4- lower alkyl, NO_2 and CN;

Y is $N(CH_2)_n$— wherein n is 0–4 or C═;

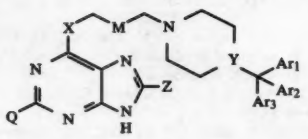
Ar_1, Ar_2 and Ar_3 are independently selected from hydrogen, C_1–C_4- lower alkyl, phenyl, substituted phenyl wherein the substituent is C_1–C_4- lower alkyl, C_1–C_4- lower alkoxy, CF_3, halo and perhalo, NO_2 and CN; naphthyl, pyridyl and thienyl; provided that when X is NH or NR_1 and Y is N, Ar_1 and Ar_2 are other than hydrogen

Z is selected from H, CN, CO_2R_3 wherein R_3 is H or C_1–C_4- lower alkyl; C_1–C_4- lower alkyl, halogen and OH;

R is selected from H, C_1–C_4- lower alkyl; cyclopentyl, cyclohexyl, benzyl, C_2–C_6- lower alkenyl, C_2–C_6- lower alkynyl, tetrahydropyranyl and tetrahydrofuranyl;

Q is selected from halo, amino, C_1–C_4- lower alkyl and OH; and the optically active isomers thereof; provided that at least one of Ar_1 Ar_2 and Ar_3 is aromatic and when Y is C═, only Ar_1 and Ar_2 are present.

21. A method for treating heart disease which comprising administering an effective amount of a compound of claim 1 of the formula



wherein X is selected from S, O, NH, NR_1 wherein R_1 is C_1-$_4$- lower alkyl; M is selected from CH_2, CHOH, CHO-COR_2 and $CHOR_2$ wherein R_2 is selected from straight or branched chain C_1-C_8- lower alkyl, phenyl and substituted phenyl wherein the substituent is C_1-C_4- lower alkoxy, CF_3, halo, NO_2, CN and C_1-C_4- lower alkyl; Y is $N(CH_2)_n$— wherein n is 0–4 or C═; Ar_1, Ar_2 and Ar_3 are independently selected from hydrogen, C_1-C_4- lower alkyl, phenyl, substituted phenyl wherein the substituent is C_1-C_4- lower alkyl, C_1-C_4- lower alkoxy, CF_3, halo and perhalo, NO_2 and CN; naphthyl, pyridyl and thienyl; provided that when X is NH or NR_1 and Y is N, Ar_1 and Ar_2 are other than hydrogen;

Z is selected from H, CN, CO_2R_3 wherein R_3 is H or C_1-C_4- lower alkyl; C_1-C_4- lower alkyl, halogen and OH;

R is selected from H, C_1-C_4- lower alkyl; cyclopentyl, cyclohexyl, benzyl, C_2-C_6- lower alkenyl, C_2-C_6- lower alkynyl, tetrahydropyranyl and tetrahydrofuranyl;

Q is selected from halo, amino, C_1-C_4- lower alkyl and OH; and the optically active isomers thereof; provided that at least one of Ar_1 Ar_2 and Ar_3 is aromatic and when Y is C═, only Ar_1 and Ar_2 are present.

4,876,258

BIPHENYLYL COMPOUNDS

Wilhelm Kump, Biel-Benken, and Peter Traxler, Schönenbuch, both of, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

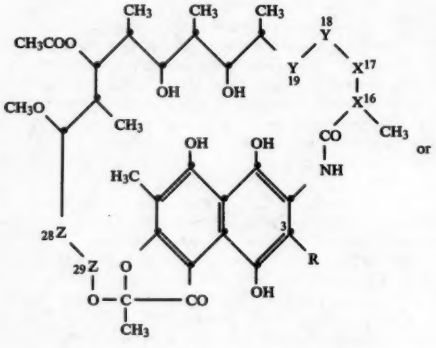
Filed Aug. 1, 1988, Ser. No. 226,487

Claims priority, application Switzerland, Aug. 13, 1987, 3124/87

Int. Cl.[4] A61K *31/495;* **C07D** *405/14*

U.S. Cl. 514—254 **12 Claims**

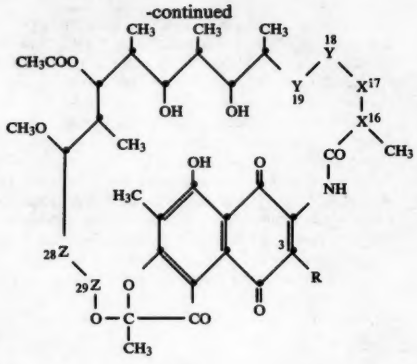
1. Rifamycin derivative of the formula



or

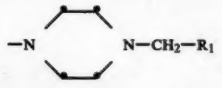
(IA)

-continued



(IB)

wherein R is a radical of the formula



(IC)

in which R_1 is an unsubstituted or is substituted biphenylyl radical, or is substituted by lower alkyl, lower alkoxy, or by halogen and wherein X—X, Y—Y and Z—Z are each vinylene of the formula CH═CH, or wherein X—X and Y—Y are each ethylene of the formula CH_2—CH_2 and Z—Z is ethylene or vinylene, and a salt of such compounds.

12. A therapeutic method for the treatment of bacterial disease or viral diseases caused by type C retroviruses which comprises administering to a warm-blooded animal, included humans, an effective dose of a compound defined in claim 1 or a pharmaceutically acceptable salt thereof.

4,876,259

3,3-DISUBSTITUTED INDOLINES

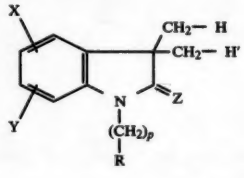
Melvyn J. Myers, and Victor J. Nickolson, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 944,953, Jan. 5, 1987, Pat. No. 4,760,043, which is a continuation-in-part of Ser. No. 850,015, Apr. 10, 1986, abandoned. This application Dec. 7, 1987, Ser. No. 129,150

Int. Cl.[4] A61K *31/50, 31/505;* **C07D** *403/06, 403/14*

U.S. Cl. 514—256 **33 Claims**

1. A compound having the formula:



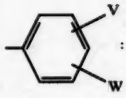
(I)

wherein:

p is 0 or 1;

Z is O or S;

R is C_1-C_{10} alkyl, C_3-C_8 cycloalkyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or



V, W, X and Y independently are H, halo, C_1–C_3 alkyl, OR^1, NO_2, CF_3, CN or NR^1R^2;
R^1 and R^2 independently are H or C_1–C_3 alkyl;
one of

— H and — H'

is a 6-membered heterocyclic aromatic ring having two nitrogen atoms as a part of the ring selected from the group pyrazine, pyrimidine or pyridazine and the other is a 6-membered heterocyclic aromatic ring having one or two nitrogen atoms as a part of the ring selected from the group pyridine, pyrazine, pyrimidine or pyridazine, each optionally substituted with one substituent selected from the group C_1–C_3 alkyl, halo, OR^1 or NR^1R^2, said heterocyclic rings attached by a ring carbon atom; or
an N-oxide or pharmaceutically suitable acid addition salt thereof.

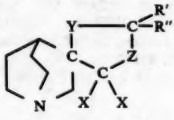
23. A method for the treatment of cognitive or neurological dysfunction in a mammal comprising administering to the mammal a therapeutically effective amount of a compound of claim 1.

4,876,260
OXATHIOLANES

Abraham Fisher, Holon, and Ishai Karton, Ness-Ziona, both of Israel, assignors to State of Israel, Israel Institute of Biological Research, Israel

Continuation-in-part of Ser. No. 114,473, Oct. 28, 1987, abandoned. This application May 2, 1988, Ser. No. 189,210
Int. Cl.[4] A61K *31/395*; C07D *497/20*
U.S. Cl. 514—278 **43 Claims**

1. A compound of the formula (I)



and geometrical isomers, enantiomers, diastereoisomers, racemates and acid addition salts thereof, wherein one of Y and Z is O and the other is $S(=O)_n$; n is 0, 1 or 2; R' and R'' are each selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, hydroxy lower alkyl, amino lower alkyl, C_{3-7} cycloalkyl, phenyl, diphenyl methylol, and lower alkyl substituted by one or two phenyl groups, provided that at least R' or R'' is other than hydrogen; and each X is hydrogen, or when Y is O and Z is $S(=O)_n$ simultaneously, then each X may also be selected from the group consisting of deuterium and tritium, and provided further that when each X is hydrogen, Y is O and Z is S simultaneously, then at least one of R' and R'' is selected from the group consisting of lower alkenyl, lower alkynyl, cyclopropyl, cyclobutyl, cycloheptyl, hydroxy lower alkyl and amino lower alkyl.

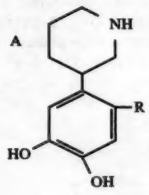
9. A pharmaceutical composition for use in treating diseases of the central nervous system in mammals, which comprises an effective central nervous system treating amount of at least one member of the group consisting of compounds of the formula (I) as depicted in claim 1, and geometrical isomers, enantiomers, diastereoisomers and racemates thereof, wherein one of Y and Z is O and the other is $S(=O)_n$; n is 0, 1 or 2; R' and R'' are each selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, hydroxy lower alkyl, amino lower alkyl, C_{3-7} cycloalkyl, phenyl, diphenyl methylol, and lower alkyl substituted by one or two phenyl groups, provided that at least R' or R'' is other than hydrogen; and each X is hydrogen, or when Y is O and Z is $S(=O)_n$ simultaneously, then each X may also be selected from the group consisting of deuterium and tritium, and provided further that when each X is hydrogen, Y is O and Z is S simultaneously, then at least one of R' and R'' is selected from the group consisting of lower alkenyl, lower alkynyl, cyclopropyl, cyclobutyl, cycloheptyl, hydroxy lower alkyl and amino lower alkyl, and pharmaceutically compatible acid addition salts thereof, together with an inert carrier or diluent.

4,876,261
SUBSTITUTED TETRAHYDROISOQUINOLINE COMPOUNDS AND COMPOSITION CONTAINING THEM

Akihiro Tanaka, 3-17-14-304, Asahicho, Nerima-Ku, Tokyo, Japan 176; Takashi Fujikura, 3–17, Shirahata 4-chrome, Urawa-shi, Saitama, Japan 336; Ryuji Tsuzuki, 2–4, Maenocho 1-chrome Itabashi-ku, Tokyo, Japan; 174 Masaki Yokota, 84, Nakazato, Yono-shi, Saitama, Japan 338, and Takeyuki Yatsu, 3–16–1, Hasune, Itabashi-ku, Tokyo, Japan 174

Filed Mar. 25, 1988, Ser. No. 173,376
Claims priority, application Japan, Mar. 27, 1987, 62-75437; May 25, 1987, 62-129368; Aug. 10, 1987, 62-200562; Aug. 10, 1987, 62-200563; Sep. 9, 1987, 62-226184; Sep. 10, 1987, 62-227398; Sep. 29, 1987, 62-247590; Oct. 7, 1987, 62-254012
Int. Cl.[4] A61K *31/47*; C07D *217/16*
U.S. Cl. 514—307 **8 Claims**

1. A compound of the Formula (I):

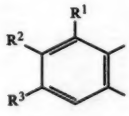


(I)

wherein

A

represents the formula



wherein
R^1 is hydrogen, lower alkyl, hydroxyl, halogen, amino or lower acylamino;
R^2 is hydrogen, lower alkyl, hydroxyl, amino or lower alkylsulfonylamino;
R^3 is hydrogen, lower alkyl or hydroxyl;
R is hydrogen or halogen, with the proviso that when R^1 is other than lower alkyl, there is no case that all of R^2, R^3 and R are hydrogens; or
a salt thereof.

5. A pharmaceutical composition useful for dilating nephrovascular tracts, said composition comprised of from about 50 to about 1,000 milligrams of the compound of claim 1 and a pharmaceutically acceptable carrier.

4,876,262
PIPERIDINE DERIVATIVE AND PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Hitoshi Oinuma, Niihari; Motosuke Yamanaka, Abiko; Kazutoshi Miyake, Ushiku; Tomonori Hoshiko, Tsuchiura; Norio Minami, Niihari; Tadao Shoji, Inashiki; Yoshiharu Daiku, Niihari; Kohei Sawada, Toride, and Kenichi Nomoto, Tsuchiura, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

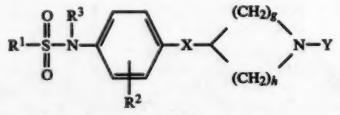
Filed Feb. 18, 1987, Ser. No. 16,035

Claims priority, application Japan, Feb. 26, 1986, 61-39270

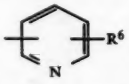
Int. Cl.[4] A61K *31/40, 31/44, 31/445, 31/495*

U.S. Cl. 514—318 **29 Claims**

1. A compound having the formula



in which R^1 is lower alkyl or tolyl; R^2 is hydrogen, hydroxyl, lower alkoxy or lower alkyl; R^3 is hydrogen, lower alkyl, lower alkenyl, cycloalkyl or cycloalkylalkyl, X is —CO—, —CH_2— or —CHOH—; g is an integer of 1, 2 or 3, h is an integer of 1, 2 or 3, with the provision that the sum of g plus h is the integer 3 or 4; Y is —A—B, wherein A is (1) —$(CH_2)_n$— wherein n is an integer of 1 to 5, (2) straight chain alkylene having 1 to 5 carbon atoms in the chain and substituted with lower alkyl, phenyl or hydroxyl, (3) straight-chain alkenylene having 2 to 5 carbon atoms, (4) —$(CH_2)_k$—S— wherein k is an integer of 2 to 5, or (5) —$(CH_2)_p$CO— wherein p is an integer of 1 to 4, and B is



wherein R^6 is hydrogen lower alkyl, lower alkoxy, cyano, imidazolyl, hydroxyl or halogen, or a pharmacologically acceptable salt thereof.

26. A method for treating or preventing the arrhythmia which comprises administering to a patient who requires such treatment a therapeutically acceptable amount of the compound defined in claim 1 or a pharmacologically acceptable salt thereof.

4,876,263
PESTICIDAL NITRO-SUBSTITUTED HETEROCYCLIC COMPOUNDS

Kozo Shiokawa, Kanagawa; Shinichi Tsuboi, Tokyo; Shoko Sasaki, Tokyo; Koichi Moriya, Tokyo; Yumi Hattori, Tokyo, and Katsuhiko Shibuya, Tokyo, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

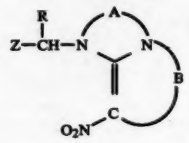
Filed Jun. 17, 1988, Ser. No. 208,421

Claims priority, application Japan, Jun. 26, 1987, 62-157528

Int. Cl.[4] C07D *487/04;* **A01N** *43/50*

U.S. Cl. 514—338 **6 Claims**

1. A nitro-substituted heterocyclic compound of the formula (I)



(I)

wherein R is hydrogen or alkyl,

Z is C_6–C_{10} aryl, or a 5 to 6-membered heterocylic group containing 1 to 2 hetero atoms selected from the group consisting of O, S and N, at least one of which is a nitrogen atom, and said aryl and heterocyclic group is unsubstituted or substituted respectively by a one member selected from the group consisting of halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkyl, C_1–C_4 alkylthio, C_1–C_4 haloalkoxy, C_1–C_4-haloalkylthio, nitro and cyano,

A is unsubstituted ethylene or ethylene substituted by methyl, or, and

B stands for 2 carbon atoms of a heterocyclic ring which is formed, together with the adjacent C-atom and N-atom and is unsubstituted or substituted by at least one substitutent selected from the group consisting of halogen, C_1–C_6 alkyl, C_1–C_4 alkoxy, alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy part, unsubstituted or substituted C_6–C_{10} aryl, keto, imino, phenoxy, C_1–C_4 alkoxythio, alkoxycarbonylimino having 1 to 4 carbon atoms in the alkoxy part, phenoxycarbonylimino, benzoylimino, benzyl, cyano, thioketo, hydroxy and C_1–C_2 alkylidene.

5. A method for combating harmful pests comprising applying to said pests and/or their habitat a pesticidally effective amount of at least one nitro-substituted heterocyclic compound according to claim 1.

4,876,264
PYRIDINE DERIVATIVES AND THEIR USE AS FUNGICIDES

Vivienne M. Anthony, Maidenhead; John M. Clough, Marlow; Paul DeFraine, Wokingham, and Christopher R. A. Godfrey, Bracknell, all of England, assignors to Imperial Chemical Industries PLC, London, England

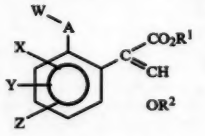
Filed Apr. 17, 1987, Ser. No. 39,450

Claims priority, application United Kingdom, Apr. 17, 1986, 8609457; Jan. 22, 1987, 8701395

Int. Cl.[4] A01N *43/40;* **C07D** *213/70, 213/71*

U.S. Cl. 514—345 **5 Claims**

1. A compound having the formula (I):



and stereoisomers thereof, wherein W is an unsubstituted pyridyl group linked to A by one of its ring carbon atoms; A is $S(O)_n$ wherein n is 0, 1 or 2; X, Y and Z, which are the same or different, are hydrogen or halogen atoms, or hydroxy, C_{1-6} alkyl (optionally substituted with one or more of hydroxy, halogen, C_{1-4} alkoxy), C_{2-6} alkenyl (optionally substituted with phenyl), C_{2-6} alkynyl, C_{1-6} alkoxy, phenyl, phenoxy, phenyl(C_{1-4})alkyl, phenyl(C_{1-4})alkoxy, C_{1-6} alkanoyloxy, benzoyloxy, amino, C_{1-4} alkylamino, di(C_{1-4})alkylamino, C_{1-6} alkanoylamino, nitro, cyano, —CO_2R^3, —$CONR^4R^5$, —COR^6 or —$S(O)_mR^7$ (wherein m is 0, 1 or 2) groups, the alkyl moieties of any of the foregoing groups being optionally substituted with one or more of hydroxy, halogen or C_{1-4} alkoxy, the phenyl moieties of any of the foregoing groups being optionally substituted with one or more of halogen,

hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, halo(C_{1-4})alkyl, C_{1-4} alkylthio, C_{1-4} alkoxy(C_{1-4})alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, phenyl, phenoxy, phenyl(C_{1-4})alkyl, phenyl(C_{1-4})alkoxy, phenoxy(C_{1-4})alkyl, C_{1-6} alkanoyloxy, benzoyloxy, cyano, thiocyanato, nitro, —NR'R", —NHCOR', —NHCONR'R", —CONR'R", —COOR', —OSO_2R', —SO_2R', —COR', —CR'=NR", or —N=CR'R" in which R' and R" are independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy, C_{1-4} alkylthio, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, phenyl or benzyl, the phenyl or benzyl groups being optionally substituted with halogen, C_{1-4} alkyl or C_{1-4} alkoxy; R^1 and R^2 which are the same or different are C_{1-4} alkyl optionally substituted by halogen; and R^3, R^4, R^5 and R^6, which are the same or different, are hydrogen atoms, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-6})alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, phenyl or phenyl(C_{1-6})alkyl in which the phenyl and alkyl moieties are optionally substituted as defined above.

5. A method of combating fungi which comprises applying to plants or seeds, or to their locus, a compound according to claim 1.

4,876,265
PROCESS AND COMPOSITIONS FOR CONTROLLING MITES PARASITIZING ON HONEY BEES

Wolfgang Schmid, Biel-Benken, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 80,251, Jul. 27, 1987, abandoned, which is a continuation of Ser. No. 686,165, Dec. 24, 1984, abandoned, which is a continuation of Ser. No. 597,888, Apr. 9, 1984, abandoned. This application Nov. 23, 1988, Ser. No. 275,254

Claims priority, application Switzerland, Apr. 14, 1983, 2002/83

Int. Cl.[4] A01N *43/78*

U.S. Cl. 514—370 **17 Claims**

1. A process for controlling mites parasitizing on honeybees, which comprises administering a miticidally effective amount of 2-(2,4-dimethyphenylimino)-3-methylthiazoline or an acid addition salt thereof to said bees.

4,876,266
1-ARALKYL-2-MERCAPTOIMIDAZOLINES AS DBH INHIBITORS

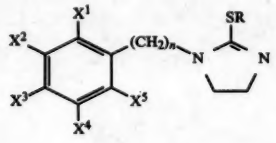
Lawrence I. Kruse, Tewin; Thomas B. Leonard, Letchworth, both of England, and Stephen T. Ross, Berwyn, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Dec. 31, 1987, Ser. No. 140,053

Int. Cl.[4] A61K *31/415*; C07D *233/42*

U.S. Cl. 514—392 **15 Claims**

1. A compound of the formula:



in which:

n is 1 to 5;

X^1 to X^5 are any accessible combination of hydrogen, halogen, C_{1-6}alkyl, C_{1-4}alkoxy, cyano, nitro, $SONH_2$, SO_2CH_3, SO_2CH_2F, SO_2CHF_2, SO_2CF_3, CF_3, CHO, OH, CH_2OH, CO_2H, or $CO_2C_pH_{p+1}$ wherein p is 1 to 4;

R is hydrogen, C_{1-4}alkyl or $(CH_2)_m$—CO_2R^1;

m is 0 to 5; and

R^1 is H or C_{1-4}alkyl; or a pharmaceutically acceptable salt thereof, provided that when n is 1 to 5 and X^1 to X^5 are all hydrogen, R is not hydrogen.

10. A method of inhibiting DBH activity in a subject which comprises administering to a subject an effective amount of a compound as claimed in claim 1.

4,876,267
5-AMINOSULPHORYL SUBSTITUTED INDOLE DERIVATIVES

Darko Butina, Arlesey; Michael D. Dowle, Ware; David E. Bays, Ware, and Colin F. Webb, Royston, all of England, assignors to Glaxo Group Limited, London, England

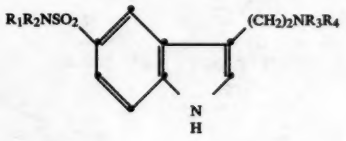
Filed Jun. 26, 1987, Ser. No. 66,498

Claims priority, application United Kingdom, Jun. 26, 1986, 8615599

Int. Cl.[4] A61K *31/40*; C07D *209/16*

U.S. Cl. 514—415 **2 Claims**

1. A method of treating a patient suffering from or susceptable to migrane which comprises administering to the patient an effective amount of a compound having a formula (I)



(I)

wherein

R_1 represents a hydrogen atom, A C_{1-6} alkyl or C_{3-6} alkenyl group; R_2 represents a hydrogen atom, C_{1-3} alkyl, C_{3-6} alkenyl, C_{5-7} cycloalkyl, phenyl, phen(C_{1-4}) alkyl in which the phenyl ring alone or as part of phen(C_{1-4})alkyl is unsubstituted or substituted b a halogen atom, C_{1-3} alkyl, C_{1-3} alkoxy, hydroxyl, or by a group NR^aR^b, or CONR^aR^b, wherein R^a and R^b, which may be the same or different, each represents a hydrogen atom or C_{1-3} alkyl; R_3 and R_4, which may be the same or different each represents a hydrogen atom, C_{1-3} alkyl or 2-propenyl; or a physiologically acceptable salt or hydrate thereof.

4,876,268
ANTIVIRAL COMPOUNDS AND USE THEREOF

Francis J. Koszyk, Chicago; Richard A. Partis, Evanston, and Richard A. Mueller, Glencoe, all of Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Filed Nov. 3, 1988, Ser. No. 266,718

Int. Cl.[4] C07D *207/12*; A61K *31/40*

U.S. Cl. 514—425 **5 Claims**

1. Acylated derivatives of 1,4-dideoxy-1,4-imino-L-arabinitol and their N-alkyl and N-hydroxyalkyl derivatives in which all the free hydroxyl groups are acylated with acyl groups having from one to six carbon atoms and in which the N-alkyl substituents in the N-alkyl and N-hydroxyalkyl derivatives contain from one to fourteen carbon atoms.

5. The method of inhibiting virus by treating a patient with a virally inhibitory effective amount of an acylated derivative of claim 1.

4,876,269
BENOZ-FUSED CYCLOALKANE TRANS-1,2-DIAMINE DERIVATIVES

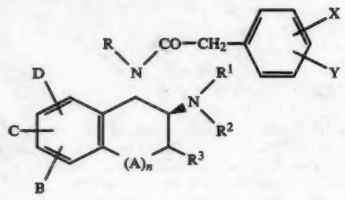
Penio Pennev, Chadds Ford, Pa.; Parthasarathi Rajagopalan, and Richard M. Scribner, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 905,543, Sep. 10, 1986, abandoned. This application Jul. 16, 1987, Ser. No. 71,028

Int. Cl.[4] A61K *31/40*; C07D *295/06*

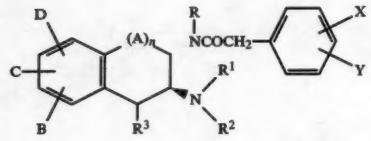
U.S. Cl. 514—429 **64 Claims**

1. A compound having the formula:



(I)

or



(II)

wherein for the enantiomers and racemic mixtures

n is 0 or 1:

A is

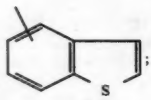
or, $—CH_2CH_2$;

B, C and D independently are selected from the group consisting of H, OH, $OCOR^5$, $OCH_2CH_2OR_5$, OR^6, R^6, CH_2OR^6, CH_2COR^7, Cl, F, Br, I NH_2, NHR^8, NR^8R^9, SH, SR^6, CH_2SR^6 and $OC(S)N(CH_3)_2$; or

two of B, C and D when on adjacent carbon atoms taken together form a fused benzo ring;

X and Y independently are selected from the group consisting of H, OCH_3, Cl, F, Br, I, NO_2, CF_3, CN, SO_2R^{10}, and SO_2CF_3 or;

X and Y taken together with the benzene ring form



;

R and R^1 independently are selected from the group consisting of H, and alkyl of 1 to 3 carbon atoms;

R_2 is H; alkyl of 1 to 6 carbon atoms; CH_2CF_3; alkenylmethyl of 3 to 6 carbon atoms; hydroxyalkylmethyl of 2 to 5 carbon atoms; cycloalkyl of 3 to 6 carbon atoms; cyclopropylmethyl; cyclobutylmethyl, or phenylalkyl of 7 to 9 carbon atoms; or R^2 can be taken together with R^1 and the nitrogen to which they are attached to be 1-azetidinyl; 1-pyrrolidinyl optionally substituted at the 3-position by OH, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or alkanoyloxy of 1 to 3 carbon atoms; 1-piperazinyl optionally substituted at the 4-position by alkyl of 1 to 3 carbon atoms; 1-morpholino; 2,5-dihydro-1H-pyrrol-1-yl; 3-azabicyclohexan-3-yl; or 3-azabicycloheptan-3-yl;

R^3 is H, but if n is 1 and A is CH^2, R^3 may also be CH_3, CH_2OH, CHO or COR^{11};

R^4 is H, alkyl of 1 to 3 carbon atoms, $—CH_2OH$, —CHO, or COR^{12};

R^5 is alkyl of 1 to 6 carbon atoms, phenyl, or mono-substituted phenyl where said substituent is an alkyl of 1 to 6 carbon atoms;

R^6, R^8, R^9, R^{10}, and R^{13} are independently an alkyl group of 1 to 3 carbon atoms; and

R^7,R^{11} and R^{12} independently are selected from the group consisting of H, OH, OR^{13}, NHR^{13}, and NR_2^{13}; or a stable N-oxide or a pharmaceutically acceptable salt thereof.

4,876,270

PESTICIDAL DIPHENYLETHYLENE DERIVATIVES

Hans-Rudolf Waespe, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

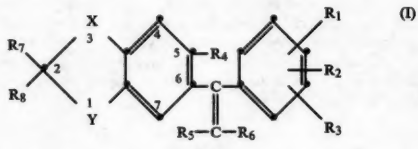
Filed Feb. 10, 1988, Ser. No. 154,661

Claims priority, application Switzerland, Feb. 13, 1987, 533/87; Jan. 14, 1988, 122/88

Int. Cl.[4] A01N *43/32, 43/30;* **C07D** *327/04*

U.S. Cl. 514—439 **24 Claims**

1. A compound of formula I



(I)

in which

R_1 and R_4 independently of one another each represents hydrogen, hydroxy, C_1–C_5-alkyl, C_1–C_8-alkoxy, C_1–C_3-alkoxy substituted by from 1 to 7 halogen atoms, alkoxyalkoxy having a total of from 2 to 6 carbon atoms, C_3–C_5-alkenyloxy or C_3–C_5-alkynyloxy;

R_2 and R_3 independently of one another each represents hydrogen, halogen, C_1–C_3-alkyl, C_1–C_5-alkoxy or nitro; or

$R_1$and R_2 and adjacent and together represent a radical —O—CH_2—O— or —O—CH_2—CH_2—O—;

R_5 and R_6 independently of one another each represents hydrogen, halogen or methyl;

$R_7$and R_8 independently of one another each represents hydrogen, methyl or ethyl; and

X and Y independently of one another each represents —O— or —S—.

19. A pesticidal composition which comprises as active ingredient a compound of formula I according to claim **1** together with a pesticidally suitable carrier or other adjuvant.

4,876,271

SUBSTITUTED THIENO[3,2-B]THIOPHENE-2-SULFONAMIDES AS TOPICALLY ACTIVE CARBONIC ANHYDRASE INHIBITORS

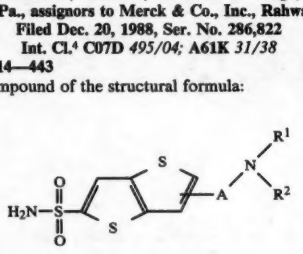
George D. Hartman, Lansdale, and John D. Prugh, Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 20, 1988, Ser. No. 286,822

Int. Cl.[4] C07D *495/04;* **A61K** *31/38*

U.S. Cl. 514—443 **10 Claims**

1. A compound of the structural formula:



or ophthalmologically or pharmaceutically acceptable salt thereof, wherein

A is C_{1-8} alkylene, either straight or branched chain and either unsubstituted or substituted with C_{1-3} alkoxy or hydroxy;

R_1 and R_2 are independently selected from:

(1) hydrogen;

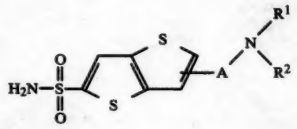
(2) C_{1-6} alkyl, either unsubstituted or substituted with one or more of the following:
- (a) C_{1-3} alkoxy;
- (b) C_{3-6} cycloalkyl;
- (c) hydroxy;
- (d) halo;
- (e) C_{1-3} alkanol;
- (f) C_{1-3} alkoxy-C_{1-3} alkanol;
- (g) C_{1-3} alkoxy-$(C_{2-4}$ alkoxy$)_n$ (wherein n=1–6)
- (h) —$S(O)_n$—C_{1-3} alkyl (wherein n=0–2); or
- (i) —NR_3R_4, wherein R^3 and R^4 are independently selected from:
  - (i) hydrogen;
  - (ii) C_{1-3} alkyl, either unsubstituted or substituted with one or more of C_{1-3} alkoxy or hydroxy;
  - (iii) C_{1-3} alkoxy-C_{1-3} alkyl; or
  - (iv) C_{1-3} alkanol;

(3)

wherein R^5 is C_{1-4} alkyl, either straight or branched chain and either unsubstituted or substituted with one or more of C_{1-3} alkoxy, or hydroxy; or

(4) taken together with the nitrogen atom to which they are attached form a heterocycle selected from the group, piperidino, morpholino, piperazino, N-C_{1-2} alkyl piperazino, thiomorpholino, thiomorpholine-S-oxide and thiomorpholine-S,S-dioxide.

9. A method of treating glaucoma and elevated intraocular pressure which comprises topical ocular application to a patient in need of such treatment of an effective intraocular pressure lowering amount of a compound with structural formula:



or an ophthalmolgically acceptable salt thereof, wherein A, R, R_1 and R_2 are as defined in claim 1.

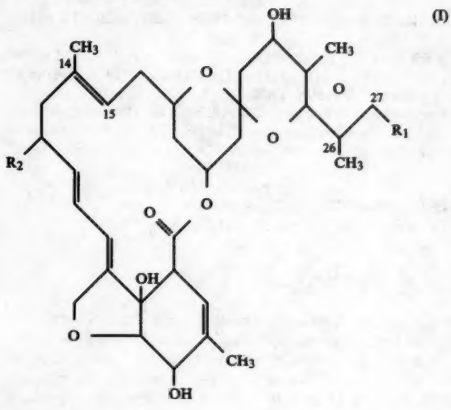
4,876,272

MONO- AND DIEPOXIDE DERIVATIVES OF LL-F28249 COMPOUNDS

Goro Asato, Titusville, and Susan Y. Tamura, Hamilton Sq., both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 6, 1987, Ser. No. 22,849
Int. Cl.[4] A61K *35/66*
U.S. Cl. 514—450 **9 Claims**

1. A compound represented by formula (I),



(I)

wherein R_1 is methyl or isopropyl; and R_2 is hydrogen, methyl or ethyl.

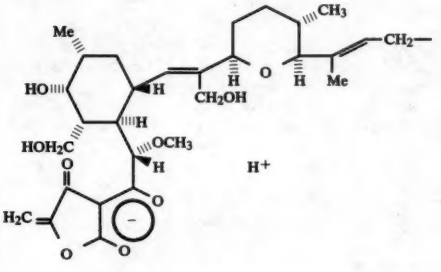
4,876,273

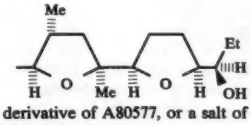
ANTIBOTIC A80577 AND PROCESS FOR ITS PRODUCTION

Robert L. Hamill, Greenwood, and Raymond C. Yao, Carmel, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 85,039, Aug. 13, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 220,650
Int. Cl.[4] A61K *31/35, 31/365;* C07D *309/06*
U.S. Cl. 514—451 **13 Claims**

1. Antibiotic A80577 which as the formula





an acyl ester or alkyl ether derivative of A80577, or a salt of A80577 or of said ester or ether derivative.

4,876,274

NEW CLASS OF PESTICIDES COMPRISING 1,4-BIS-SUBSTITUTED-2,6,7-TRIOXABICYCLO(2.2.2)OCTANES

Christopher J. Palmer, Ipswich, England, and John E. Casida, Berkeley, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 692,818, Jan. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 575,843, Jan. 30, 1984, abandoned. This application Aug. 27, 1986, Ser. No. 902,083

Int. Cl.[4] A01N *43/32, 51/00*

U.S. Cl. 514—452 20 Claims

1. A pesticidal composition, comprising:
a compound having a formula

$$R—C(CH_2O)_3C—X$$

wherein R and X are each organic substituents, said compound having the characteristic of exhibiting an LD_{50} for pesticidal activity against *Musca domestica, Periplaneta americana,* the mosquito larvae, the black bean aphid, the German cockroach or the milkweed bug, in micrograms of compound per gram of body weight of *Musca domestica, Periplaneta americana,* the mosquito larvae, the black bean aphid, the German cockroach or the milkweed bug, of no more than about 400.

4,876,275

3,4-DIHYDRO-2H-PYRANS USEFUL AS PESTICIDES

Walter Himmele, Walldorf; Hans Theobald, Limburgerhof; Franz Merger, Frankenthal; Ernst Hofmann, Ludwigshafen; Christoph Kuenast, Otterstadt, and Peter Hofmeister, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

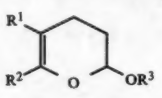
Filed Apr. 1, 1988, Ser. No. 176,700

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711269

Int. Cl.[4] A01N *43/16;* C07D *309/30*

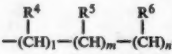
U.S. Cl. 514—452 6 Claims

1. A 3,4-Dihydro-2H-pyran of the formula



(I)

where R^1 is C_4–C_{20}-alkyl, C_4–C_{20}-alkoxyalkyl, phenyl or C_7–C_{20}-phenylalkyl, or is phenyl or C_7–C_{20}-phenylalkyl which bears from one to three substituents selected from the group consisting of haiogen, C_1–C_8-alkyl, C_1–C_8-haloalkyl, C_1–C_8-alkoxy or C_1–C_8-haloalkoxy, R^2 is hydrogen or C_1–C_4-alkyl, R^3 is the radical



where R^4, R^5 and R^6 are hydrogen or C_1–C_4-alkyl, R^7 is phenyl or benzoyl, or phenyl or benzoyl bearing from one to three substituents selected from the group consisting of halogen, C_1–C_8-alkyl, C_8-alkyl, C_1–C_8-haloalkyl, C_1–C_8-alkoxy and C_1–C_8-haloalkoxy, or a five- or six-membered heterocycle containing one or two oxygen atoms and which is either unsubstituted or substituted by one to three C_1–C_8-alkyl groups or one C_3–C_6-spirocycloalkyl, and l, m and n are 0 or 1.

4,876,276

(3S-4S)-7-HYDROXY-Δ^6-TETRAHYDROCANNABINOLS

Raphael Mechoulam; Jeffery J. Feigenbaum, both of Jerusalem; Naphtali Lander, Tel-Aviv, all of Israel, and Morris Srebnik, Lafayette, Ind., assignors to Yissum Research Development Co. of The Hebrew University of Jerusalem, Jerusalem, Israel

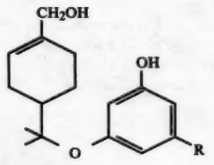
Filed Oct. 26, 1987, Ser. No. 112,705

Claims priority, application Israel, Oct. 24, 1986, 80411

Int. Cl.[4] A61K *31/35;* C07D *311/80*

U.S. Cl. 514—454 10 Claims

1. A compound having the (3S,4S) configuration, which is essentially free of the (3R,4R) enantiomer, of the formula:



wherein R is selected from:

a. straight or branched alkyl of 6 to 12 carbon atoms;

b. a group —O—R′, where R′ is straight or branched alkyl to 5 to 9 carbon atoms, or a straight or branched alkyl substituted at the terminal carbon atom by a phenyl group;

c. a group $—(CH_2)_n—O—$alkyl, where n is an integer of from 1 to 7 and the alkyl group contains 1 to 5 carbon atoms, wherein at least one of the —OH group can be esterified to provide an ester group having from 1 to 5 carbon atoms.

4,876,277

ANTIMICROBIAL/ANTIFUNGAL COMPOSITIONS

Basil A. Burke, Palo Alto, Calif., and Muraleedharan G. Nair, East Lansing, Mich., assignors to Plant Cell Research Institute, Inc., Dublin, Calif.

Filed May 29, 1987, Ser. No. 55,737

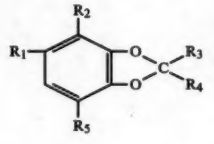
Int. Cl.[4] C07D *317/64, 317/46*

U.S. Cl. 514—465 18 Claims

1. An antimicrobiol composition comprising in operative combination:

(a) at least one 4,5-substituted-2,3-alkylidenedioxy-1-olefinic benzene;

(b) said 4,5-substituted-2,3-alkylidenedioxy-1-olefinic benzene being selected from the group consisting of compounds of the formula:



wherein R_1 and R_2 may be the same or different and are selected from OH and C_1–C_5 alkoxy (—OR) groups, R_3 and R_4 are selected from H and C_1–C_5 alkyl, alkenyl and alkynyl groups, and R_5 is selected from C_3–C_7 alkyl, alkenyl and alkynyl groups, and R_5 is not allyl when R_1 is methoxy, R_2 is OH or methoxy, and R_3 and R_4 are each H;

(c) a plant-compatible carrier material;

(d) said 4,5-substituted-2,3-alkylidenedioxy-1-olefinic benzene being present in association with said carrier material to form a composition; and

(e) said 4,5-substituted-2,3-alkylidenedioxy-1-olefinic benzene being present in said composition in an amount sufficient to impart anti-microbiol properties thereto, and said

carrier material being present as the major component of said composition.

4,876,278

ZINC GLYCEROLATE COMPLEX AND ADDITIONS FOR PHARMACEUTICAL APPLICATIONS

Reginald M. Taylor, Hawthorn, and Alan J. Brock, North Adelaide, both of Australia, assignors to Glyzinc Pharmaceuticals Limited, Perth, Australia

Continuation of Ser. No. 56,483, Apr. 23, 1987, abandoned. This application Dec. 1, 1988, Ser. No. 278,338

Int. Cl.[4] A61K *31/315;* **514** *844, 494*

U.S. Cl. 514—494 **4 Claims**

1. A method for the treatment of gastric bleeding or ulceration comprising orally or parenterally administering to a human an effective amount of a zinc glycerolate complex ($C_3H_6O_3Zn$) comprising plate-like crystals.

4,876,279

ANTIHYPERCHOLESTEROLEMIC COMPOUNDS

Ta J. Lee; William F. Hoffman, both of Lansdale, and Clarence S. Rooney, Worcester, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

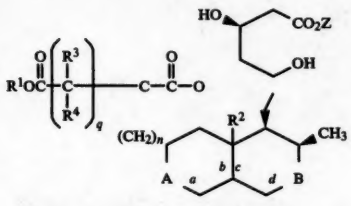
Division of Ser. No. 859,525, May 5, 1986, Pat. No. 4,766,145. This application May 26, 1988, Ser. No. 199,829

Int. Cl.[4] C07C *69/74;* **A61K** *31/19, 31/215*

U.S. Cl. 514—510 **16 Claims**

1. A compound represented by the following general structural formula (II):

(II)



wherein:

q is 0 to 5;

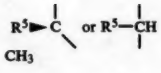
n is 2 to 7;

R^1 is C_{1-6} alkyl,

R^2 is hydrogen or hydroxy;

R^3 and R^4 independently are hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl, phenyl or phenyl substituted with X and Y and when q is 2 to 5, each of the R^3s and R^4s are independently hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl or only one of the R^3s and R^4s is phenyl or substituted phenyl;

A is

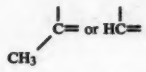


in which R^5 is hydrogen or hydroxy;

B is

in which R^6 is hydrogen or hydroxy;

a, b, c and d represent single bonds, one of a, b, c or d represents a double bond or both a and c or both b and d represent double bonds, provided that when a is a double bond, A is

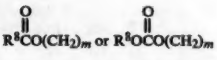


and when d is a double bond,

X and Y independently are hydrogen, halogen, trifluoromethyl, C_{1-3} alkyl, nitro, cyano or a group selected from:

(a) $R^7O(CH_2)_m$ in which m is 0 to 3 and R^7 is hydrogen, C_{1-3} alkyl or hydroxy-C_{2-3} alkyl;

(b)



in which R^8 is hydrogen, C_{1-3} alkyl, hydroxy-C_{2-3} alkyl, phenyl, naphthyl, amino-C_{1-3} alkyl, C_{1-3} alkylamino-C_{1-3} alkyl, di(C_{1-3} alkyl)amino-C_{1-3} alkyl, hydroxy-C_{2-3} aklylamino-C_{1-3} alkyl or di(hydroxy-C_{2-3} alkyl)amino-C_{1-3} alkyl;

(c)

in which R^9 is hydrogen, C_{1-3} alkyl, hydroxy-C_{1-3} alkyl, C_{1-3} alkoxy-C_{1-3} alkyl, phenyl or naphthyl;

(d) $R^{10}R^{11}N(CH_2)_m$,

or

in which R^{10} and R^{11} independently are hydrogen, C_{1-3} alkyl, hydroxy-C_{2-3} alkyl or together with the nitrogen atom to which they are attached form a heterocycle group selected from piperidinyl, pyrrolidinyl, piperazinyl, morpholinyl or thiomorpholinyl;

(e) $R^{12}S(O)_p(CH_2)_m$ in which p is 0 to 2 and R^{12} is hydrogen, C_{1-3} alkyl, amino, C_{1-3} alkylamino or di(C_{1-3} alkyl)amino;

Z is hydrogen, C_{1-5} alkyl or C_{1-5} alkyl substituted with a group selected from phenyl, dimethylamino or acetylamino; or

a pharmaceutically acceptable salt of a compound of the formula (II) in which Z is hydrogen.

4,876,280

ARYLCYCLOHEXANE AND ARYLCYCLOHEXENE ANALOGS OF MEVALONOLACTONE DERIVATIVES AND THEIR USE

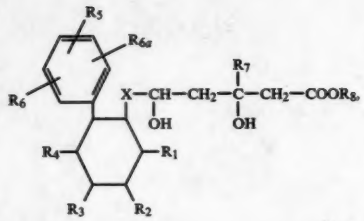
Robert E. Damon, II, Wharton, N.J., assignor to Sandoz Pharm. Corp., E. Hanover, N.J.

Filed Mar. 10, 1988, Ser. No. 166,356

Int. Cl.[4] A61K *31/19, 31/215*

U.S. Cl. 514—510 **13 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, C_{1-3}alkyl, n-butyl, i-butyl or t-butyl,

R_2 is hydrogen or C_{1-3}alkyl,

R_3 is hydrogen or C_{1-3}alkyl,

R_4 is hydrogen, C_{1-3}alkyl, n-butyl, i-butyl or t-butyl,

R_5 is hydrogen, C_{1-3}alkyl, n-butyl, i-butyl, t-butyl, C_{1-3}alkoxy, n-butoxy, i-butoxy, fluoro, chloro, trifluoromethyl, phenoxy or benzyloxy,

R_6 is hydrogen, C_{1-3}alkyl, C_{1-3}alko; fluoro, chloro, trifluoromethy, phenoxy or benzyloxy, with the provisos that not more than one of R_5 and R_6 is trifluoromethyl, not more than one of R_5 and R_6 is phenoxy, and not more than one of R_5 and R_6 is benzyloxy, or

R_5 and R_6 are attached to adjacent carbon atoms and taken together form a radical of the formula —CH=CH—CH=CH—,

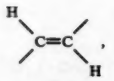
R_{6a} is hydrogen, C_{1-2}alkyl, fluoro or chloro,

R_7 is hydrogen or C_{1-3}alkyl,

R_8 is hydrogen, R_9 or M, wherein R_9 is a physiologically acceptable ester group, and

M is a cation,

X is $—CH_2CH_2—$ or



and the broken line represents a double (π) bond or two hydrogen atoms (one on each carbon atom).

4,876,281
ANTIFUNGAL AGENTS

Susumu Yoshida; Shizutoshi Nakagawa; Tsuyoshi Ushiroguchi; Hiromichi Matsuura, and Akira Yazaki, all of Koda, Japan, assignors to Wakunaga Seiyaku Kabushiki Kaisha, Osaka, Japan

Filed Sep. 4, 1987, Ser. No. 93,001
Claims priority, application Japan, Sep. 5, 1986, 61-208902
Int. Cl.[4] A61K *31/60*
U.S. Cl. 514—517 **8 Claims**

1. An antifungal agent comprising as an effective component a polysulfide compound represented by the formula

$$R_1—S(O)_p—R_2 \quad (A)$$

wherein

R_1 is $CH_3—$, $CH_2=CHCH_2—$ or $C_2H_5OCO(CH_2)_3—$,

p is an integer 1 or 2, and

R_2 is $—S—CH_2CH=CH_2$ or $—CH_2CH(H)\quad CH(H)—S_q—S(O)_r—R_3$ in which $—CH_2CH(H)\quad CH(H)—$ is $—CH_2CH_2CH_2—$ or $—CH_2CH=CH—$,

q is an integer 0 or 1, r is integer from 0 to 2, and R_3 is selected from the group consisting of alkyl having 1 to 6 carbon atoms, benzyl, $—CH_2CH=CH_2$, $—CH_2CH=CHCH_3$, $—(CH_2)_3COOC_2H_5$, and $—CH=CHCH_2—S—(CH_2)_3COOC_2H_5$,

with the proviso that p is 2 when R_1 is $CH_2=CHCH_2—$, R_2 is $—CH_2CH(H)\quad CH(H)—S_q—S(O)_r—R_3$ in which $—CH_2CH(H)\quad CH(H)—$ is $—CH_2CH=CH—$, q is 1, r is 0 and R_3 is $—CH_2CH=CH_2$, and

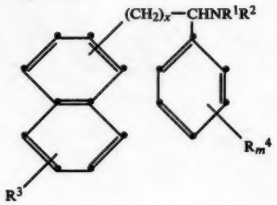
a carrier therefor, the antifungal agent being for combating pathogenic fungus selected from the group consisting of Candida and Aspergillus.

4,876,282
1-PHENYLALKYLAMINES AS SELECTIVE SEROTONIN UPTAKE INHIBITORS

David W. Robertson, Greenwood, and David T. Wong, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 25, 1987, Ser. No. 125,110
Int. Cl.[4] A61K *31/207*
U.S. Cl. 514—554 **19 Claims**

1. A compound of the formula



wherein:

each of R^1 and R^2 independently is hydrogen or methyl;

R^3 is hydrogen, halo, C_1–C_4 alkyl, C_1–C_3 alkoxy or trifluoromethyl;

each R^4 independently is hydrogen, halo, C_1–C_4 alkyl, C_1–C_3 alkoxy or trifluoromethyl;

m is 1 or 2;

x is 2–5; or

a pharmaceutically acceptable acid addition salt thereof.

4,876,283
ANTISNORING AGENT

Dietrich Reichert, Can d'en Pol, Sta.Eulalia d.R., Ibiza, Spain

Division of Ser. No. 47,560, Apr. 27, 1987, which is a continuation of Ser. No. 609,287, May 11, 1984, abandoned. This application Mar. 20, 1989, Ser. No. 325,684
Claims priority, application Fed. Rep. of Germany, May 13, 1983, 3317530; May 13, 1983, 3317538
Int. Cl.[4] A61K *31/195, 31/135*
U.S. Cl. 514—562 **4 Claims**

1. A method for substantially reducing or eliminating snoring in humans, comprising the step of orally administering to humans afflicted with snoring, a composition containing a therapeutically effective amount of bromohexim in a dose of from 30 to 100 mg in a suitable carrier.

4,876,284

1-ALKYL-2-AMINOTETRALIN DERIVATIVES

Folke L. E. Arvidsson, Uppsala; Per A. E. Carlsson, Gothenburg; Uli A. Hacksell, Uppsala; John S. M. Hjorth, Gothenborg; Anette M. Johansson, Uppsala, and Per L. Lindberg, Askim, all of Sweden, assignors to Per Arvid Emil Carlsson, Gothenburg, Sweden

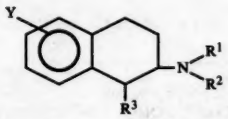
Continuation of Ser. No. 16,447, Feb. 23, 1987, which is a continuation of Ser. No. 610,241, May 14, 1984, which is a continuation of Ser. No. 374,769, May 4, 1982, abandoned. This application Jan. 11, 1988, Ser. No. 143,260

Claims priority, application Sweden, May 8, 1981, 8102908

Int. Cl.[4] C07C *87/64, 87/28*

U.S. Cl. 514—657 25 Claims

1. A compound of the formula



I

wherein R^3 the NR^1R^2 group are in a cis-position to each other and wherein Y is in position 5 and is OH, or R^6O, whereby and R^6 is an allyl or benzyl group; R^1 is hydrogen or an alkyl group having 1–3 carbon atoms; R^2 is an alkyl group having 1-6 carbon atoms, a phenylalkyl- or m-hydroxyphenylalkyl group with 2–4 carbon atoms in the alkyl part, or an alkenyl group with 3–6 carbon atoms other than 1-alkenyl, and R^3 is an alkyl group having 1–3 carbon atoms, as the base or a pharmaceutically acceptable acid addition salt thereof.

4,876,285

VINYL FLUORIDES AND PESTICIDAL USES

Clinton J. Peake, Trenton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

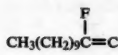
Filed Mar. 2, 1987, Ser. No. 18,768

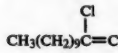
Int. Cl.[4] A01N *29/02*

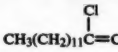
U.S. Cl. 514—746 7 Claims

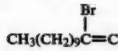
1. A method of controlling nematodes, which comprises applying to the locus where control is desired a nematicidally effective amount of a vinyl fluoride compound selected from the group consisting of

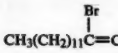
$CH_3(CH_2)_7CH{=}CF_2$,
$CH_3(CH_2)_8CH{=}CF_2$,
$CH_3(CH_2)_9CH{=}CHF$,
$CH_3(CH_2)_9CH{=}CFCl$,
$CH_3(CH_2)_9CH{=}CFBr$,
$CH_3(CH_2)_9CH{=}CF_2$,





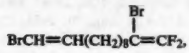


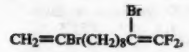




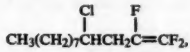
-continued

$CH_2BrCHBr(CH_2)_8CH{=}CF_2$,
$CH_2{=}CH(CH_2)_8CH{=}CF_2$,
$BrCH{=}CH(CH_2)_8CH{=}CF_2$,
$CH_2{=}CBr(CH_2)_8CH{=}CF_2$,

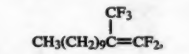


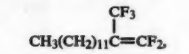


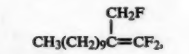
$CH_3(CH_2)_{10}CH{=}CHF$,
$CH_3(CH_2)_{10}CH{=}CF_2$,
$CH_3(CH_2)_{11}CH{=}CF_2$,

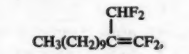


$CH_2ClCHCl(CH_2)_8CH{=}CF_2$,









4,876,286

PROCESS FOR THE PRODUCTION OF METHANOL AND A COMPOSITION SUITABLE FOR USE AS A CATALYST IN SAID PROCESS

Swan T. Sie; Eit Drent, and Willem W. Jager, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 175,026, Mar. 30, 1988, Pat. No. 4,812,433. This application Nov. 14, 1988, Ser. No. 270,599

Claims priority, application United Kingdom, Apr. 3, 1987, 8708005

Int. Cl.[4] C07C *27/06, 31/06*

U.S. Cl. 518—700 21 Claims

1. A process for the production of methanol which comprises the following consecutive steps:

Step 1: Preparing a catalytic system by combining the following components:

Component (a): a nickel salt,

Component (b): a hydride selected from the group consisting of a hydride of an alkali metal, a hydride of an alkaline earth metal, and a mixture thereof, and

Component (c): an ester of formic acid which originates from an external source, and allowing the combined components (a), (b) and (c) to react; and

Step 2: Contacting a gaseous mixture comprising carbon monoxide and

hydrogen with the catalytic system prepared in step 1.

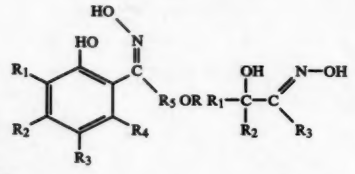
4,876,287

SELECTIVE ION-COMPLEXING MEDIA FOR THE REMOVAL OF METAL-ION CONTAMINANTS FROM PLATING BATHS

Walter C. Babcock, and Dwayne T. Friesen, both of Bend, Oreg., assignors to Bend Research, Inc., Bend, Oreg.

Division of Ser. No. 642,419, Aug. 20, 1984, Pat. No. 4,702,838. This application Nov. 10, 1986, Ser. No. 929,005
The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.
Int. Cl.[4] C08D 5/20
U.S. Cl. 521—28 18 Claims

1. An ion-complexing gel selective to copper ions in a copper ion- and nickel ion-containing solution comprising a hydrophobic nonporous polymer plasticized and swollen with a hydroxyoxime complexing agent of the formula



wherein R_1 is selected from hydrogen, alkyl, aryl and CH=N—OH; and R_2, R_3, R_4 and R_5 are selected from hydrogen, alkyl and aryl.

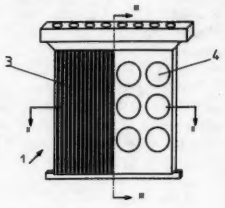
4,876,288

CARRIER MATERIAL FOR IMMOBILIZATION OF MICROORGANISMS

Walter Herding, Amberg, and Walter Rausch, Altdorf, both of Fed. Rep. of Germany, assignors to Herding GmbH Entstaubungsanlagen, Amberg, Fed. Rep. of Germany

Filed Apr. 7, 1987, Ser. No. 35,636
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1986, 3611582
Int. Cl.[4] C08G 18/00
U.S. Cl. 521—53 19 Claims

1. Carrier material for the immobilization of microorganisms, particularly for use in connection with microbiological conversion and/or separation of constituents from gaseous or liquid media, which consists essentially of: a dimensionally stable macroporous skelton having a pore size of from abut 10 to 200 μm, said skelton having been formed by bonding together a relatively coarse-grain pre-formed granular first component and a relatively fine grain granular microporous second component such that the spaces between the individual granules of said first and second components define micropores, said second component comprising micropores having a pore size of up to 0.1 μm, said micropores and said macropores



providing immobilization sites for the absorption of microorganisms.

4,876,289

HYDROPHILIZED POROUS MEMBRANE AND PRODUCTION PROCESS THEREOF

Hajime Itoh, Hiroshima, and Kazutami Mitani, Ohtake, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jul. 1, 1988, Ser. No. 214,473
Int. Cl.[4] C08J 9/04
U.S. Cl. 521—54 4 Claims

1. A hydrophilized porous membrane, wherein a crosslinked hydrophilic polymer composed principally of diacetone acrylamide is physically held on at least a part of the pore walls of a starting porous membrane of a polyolefin which has been rendered porous by a stretching technique.

4,876,290

MICROENCAPSULATION BY INTERFACIAL POLYADDITION

Gilbert Vivant, Lyon, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Feb. 11, 1988, Ser. No. 154,357
Claims priority, application France, Feb. 11, 1987, 87 01899
Int. Cl.[4] B01J 13/02
U.S. Cl. 521—76 14 Claims

1. A process for the production of microcapsules, comprising emulsifying a hydrophobic organic liquid which includes an aliphatic diisocyanate and an isocyanurate ring trimer of an aliphatic diisocyanate, in an essentially aqueous liquid containing a protective colloid, a surfactant, or both, wherein the weight ratio of aliphatic diisocyanate/trimer ranges from 0.05/1 to 0.70/1 and the surface tension between the aqueous phase and the hydrophobic organic phase ranges from 0 to 20 mN/m, and then forming microcapsules by interfacially reacting a polyamine with the emulsion which results, thereby constituting polyurea walls of said microcapsules by polyaddition.

4,876,291

MINERAL FILLER FIRE RETARDANT COMPOSITION AND METHOD

Anthony J. Dallavia, Jr., Marietta; Susan Vande Ven, Marietta, and Bobby E. Smith, Ranger, all of Ga., assignors to J.M. Huber Corporation, Rumson, N.J.

Division of Ser. No. 236,064, Aug. 24, 1988. This application May 19, 1989, Ser. No. 354,532
Int. Cl.[4] C08K 9/00; C08J 9/04
U.S. Cl. 521—124 15 Claims

1. A particulate fire retardant compositions comprising:
a particulate alumina trihydrate mineral filler; and
a polymeric material formed from a polyfunctional isocyanate, said polymeric material being present in an amount sufficient to coat said particulate filler without substantially agglomerating said particulate filler, said particulate

filler containing an initiator in an amount sufficient to effect reaction polymerization of said polyfunctional isocyanate.

4,876,292

ISOCYANATE REACTIVE MIXTURE AND THE USE THEREOF IN THE MANUFACTURE OF FLEXIBLE POLYURETHANE FOAMS

Charles M. Milliren, Coraopolis, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

Filed Oct. 6, 1988, Ser. No. 254,326
Int. Cl.[4] C08G *18/32*
U.S. Cl. 521—159 **8 Claims**

1. A flexible foam prepared by reacting:

(A) from more than 0 to up to 3 parts by weight per 100 parts by weight of components (B) and (C) of an amine of the formula:

$$H_2N—R—NH_2$$

where R is a C_3 to C_{10} straight or branched alkylene group, or a C_4 to C_{15} alicyclic group,

(B) from 0 to 30% by weight of a polyoxyalkylene polyamine having a molecular weight of from about 400 to about 5000 and containing from 2 to 3 primary amino groups, and

(C) from 70 to 100% by weight of one or more polyether polyhydroxyl compounds having hydroxyl functionalities of from 2 to 3 and molecular weights of from about 1000 to about 10,000, the percents by weight of components B) and C) totalling 100%; and

(D) a polymethylene poly phenyl isocyanate) containing from about 40 to about 85% by weight of methylenebis(-phenyl isocyanate) and/or a prepolymer of such isocyanate, said prepolymer having an isocyanate content of from about 15 to about 30% by weight, in the presence of

(E) a blowing agent, at an isocyanate index of from 60 to 140.

4,876,293

TEXTILE ADHESIVES COMPRISING A LATEX BINDER CONSISTING ESSENTIALLY OF STYRENE, BUTADIENE, AND MONOESTER OF MALEIC OR FUMATIC ACID

Cronin Rebecca L. Durney, Newark, Del.; Rutherford W. Scott, Concord, and James F. Campbell, Cornelius, both of N.C., assignors to Reichhold Chemicals, Inc., White Plains, N.Y.

Filed Jul. 18, 1988, Ser. No. 220,588
Int. Cl.[4] C08K *3/26*; C08F *220/10, 222/16*; C08L *33/04*
U.S. Cl. 523—122 **17 Claims**

1. A latex textile binder composition consisting essentially of:

(a) about 2 to 90 weight % styrene;

(b) about 15 to 98 weight % butadiene;

(c) about 0.1 to 10 weight % of a monoester of maleic or fumaric acid having the following structure:

ROOC—CH=CH—COOH

wherein R is a C_1 to C_{12} alkyl group,

and wherein said composition has a viscosity of about 8,000 to 15,000 centipoise.

4,876,294

FOUNDRY BINDER SYSTEMS BASED UPON ACRYLATED EPOXY RESINS AND EPOXY RESINS

H. Randall Shriver, Gahanna; William R. Dunnavant, Worthington, both of Ohio, and Bruce A. Gruber, Emmaus, Pa., assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Sep. 13, 1988, Ser. No. 243,672
Int. Cl.[4] C08K *3/36*; B22C *9/02*
U.S. Cl. 523—139 **14 Claims**

1. A foundry binder system which will cure in the presence of sulfur dioxide comprising as separate components:

(a) a blend of an acrylated epoxy resin and a monoester solvent; and

(b) an oxidizing agent; and a blend of an epoxy resin and an aromatic hydrocarbon solvent which is part of component (a), (b), or both.

4,876,295

FLEXIBLE THERMOPLASTIC EPOXY RESIN AND COATINGS PREPARED THEREFROM

Michael B. Cavitt, Lake Jackson, and David J. Duncan, Freeport, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 24,748, Mar. 11, 1987, Pat. No. 4,755,542. This application Apr. 18, 1988, Ser. No. 182,803
Int. Cl.[4] C08L *63/10*; C08F *283/10*
U.S. Cl. 523—172 **24 Claims**

1. A thermally stable, flexible thermoplastic epoxy resin resulting from

(A) reacting, in the presence of an effective quantity of a catalyst for effecting the reaction between a vicinal epoxide and an aromatic hydroxyl group, a mixture comprising

(1) at least one aromatic based epoxy resin having an average of more than 1 but not more than about 2.1 vicinal epoxy groups per molecule;

(2) at least one aliphatic based epoxy resin having an average of more than 1 but not more than about 2.1 vicinal epoxy groups per molecule;

(3) at least one material having an average of more than 1 but not more than about 2 phenolic hydroxyl groups per molecule;

wherein components (1) and (2) are employed in quantities such that from about 90 to about 99.6 percent of the vicinal epoxy groups are contributed by the aromatic based epoxy resin and from about 10 to about 0.4 percent of the vicinal epoxy groups are contributed by the aliphatic based epoxy resin; and wherein component (3) is employed in quantities such that the resultant product has an epoxide equivalent weight of from about 1600 to about 2500, calculated on the basis that the aromatic groups contained therein are free of substituent groups even if they do in fact contain substituent groups;

(B) reacting, in the presence of an effective quantity of a catalyst for reacting a vicinal epoxide group with a carboxylic acid group, the product resulting from (A) with

(4) at least one aromatic or aliphatic monocarboxylic acid in a quantity which provides a ratio of moles of component (4) per epoxide group contained in component (1) of from about 0.033:1 to about 0.2:1;

(C) reacting, in the presence of an effective quantity of a catalyst for effecting the reaction between a vicinal epoxide group and a group selected from —OH, —SH, —COOH or —CO—O—CO— groups, the product resulting from (B) with a mixture comprising

(5) an aromatic based epoxy resin having an average of more than 1 but not more than about 2.1 vicinal epoxy groups per molecule and an epoxide equivalent weight of not greater than about 225, suitably not greater than about 200, more suitably not greater than about 195, calculated on the basis of the aromatic groups being free of substituent groups whether or not they do in fact contain substituent groups; and

(6) a reactive material having only one group per mole-

cule which is reactive with a vicinal epoxy group selected from —OH, —SH, —COOH or —CO—O—CO— groups;

wherein component (5) is employed in an amount which provides a ratio of vicinal epoxy groups from component (5) to the combined amount epoxy groups contained in components (1) and (2) of from about 0.42:1 to about 0.48:1: and component (6) is employed in an amount which provides from about 0.87 to about 1 group reactive with a vicinal epoxy group per combined vicinal epoxy group contained in the product from (B) and component (5); and

(D) reacting, in the presence of an effective quantity of a catalyst for effecting the reaction between a vicinal epoxy group and a carboxyl group, the product resulting from (C) with

(7) a carboxyl terminated elastomer in an amount which provides a ratio of carboxyl groups per vicinal epoxy group contained in components (1) and (2) of from about 0.0028:1 to about 0.03:1;

with the proviso that the combined quantity of groups reactive with an epoxide group from components (3), (4), (6) and (7) cannot exceed the combined quantity of epoxide groups contained in components (1), (2) and (5) and.

4,876,296

METHOD AND COMPOSITION FOR CONTROLLED THICKENING OF THERMOSETTING RESINS USING MICROENCAPSULATED THICKENERS

J. Stanley Miller, North Haven, Conn., and Thomas J. Bowles, Dayton, Ohio, assignors to Olin Corporation, Cheshire, Conn.

Filed Apr. 27, 1987, Ser. No. 43,055

Int. Cl.[4] C08K *9/00;* **B01J** *13/02;* **B05D** *7/00;* **B32B** *5/16*

U.S. Cl. 523—200 **3 Claims**

1. A composition comprising at least one unsaturated polyester, at least one thermoplastic low-profile additive, at least one binder selected from the group consisting of reinforcing agents, fillers, and combinations thereof, at least one microencapsulated thickener, and a catalyst selected from the group consisting of peroxyesters, peroxyketones, peroxyketals, and mixtures thereof, and wherein said microencapsulated thickener comprises microcapsules having a capsule shell of at least one thermoplastic polymer and a capsule core containing a thickener selected from the group consisting of magnesium oxide, magnesium hydroxide, calcium oxide, calcium hydroxide, and combinations thereof, and wherein said capsule shells comprise a thermoplastic polymer selected from the group consisting of polyethylene, polystyrene, cellulose acetate butyrate, and combinations thereof, and wherein said microcapsules have a particle size of between about 5 and about 30 microns, said low-profile additive being a polyurethane oligomer having a molecular weight of between about 10,000 and about 30,000.

4,876,297

METHOD OF PRODUCING MIXTURES OF RUBBER OR RUBBER-LIKE MATERIAL, AND CARBON BLACK

Julius Peter, Tiergartenstr. 107, D-3000 Hannover 71, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,459

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723533

Int. Cl.[4] C08L *21/22;* **C08K** *3/04;* **C08J** *3/20*

U.S. Cl. 523—351 **13 Claims**

1. A method of producing a mixture that contains elastomeric material, and carbon black, said method including the steps of:

adding to said elastomeric material a portion only of the intended total quantity of carbon black;

thereupon preheating the above in a high-frequency alternating field; and subsequently

adding-in the remainder of the intended total quantity of carbon black.

4,876,298

EPOXY RESIN COMPOSITION

Kunio Itoh, and Toshio Shiobara, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,439

Claims priority, application Japan, Jun. 3, 1987, 62-139447

Int. Cl.[4] C08K *3/36;* **C08L** *83/10, 63/04, 63/00*

U.S. Cl. 523—433 **8 Claims**

1. An epoxy resin composition comprising an epoxy resin, a curing agent for said epoxy resin, and a modified polymer obtaind by reaction between an aromatic polymer and a member selected from the group consisting of monomers, oligomers and polymers each having at least one fluorine atom in one molecule.

4,876,299

OXALANILIDES USEFUL AS U.V. ABSORBERS

Lajos Ávár, Biel-Benken, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

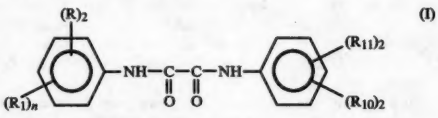
Filed Apr. 1, 1987, Ser. No. 32,672

Claims priority, application United Kingdom, Apr. 4, 1986, 8608315

Int. Cl.[4] C07D *211/56;* **C07C** *103/147;* **C08K** *5/34, 5/20*

U.S. Cl. 524—99 **13 Claims**

1. A compound of formula I

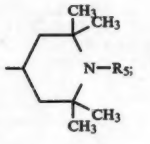


in which each R independently, is hydrogen, C_{1-8}alkyl, C_{1-8}alkoxy or halogen or both groups R are attached to carbon atoms in a position ortho to one another and together with the carbon atoms to which they are attached form a cyclopentylene or cyclohexylene group;

n is 1 or 2;

R_1 is $—OCH_2—CO—X—R_4$ where X is —O— or —N(R_3)—;

R_4 is



R_3 is hydrogen or C_{1-4}alkyl; and

R_5 is hydrogen, oxygen, C_{1-8}alkyl or —CO—R_6;

R_6 is C_{1-6}alkyl, phenyl, —CO—OC_{1-4}alkyl or —NR_7R_8;

R_7 is hydrogen, C_{1-12}alkyl; C_{5-6}cycloalkyl, phenyl or C_{1-12}alkyl phenyl;

R_8 is hydrogen or C_{1-12}alkyl;

each R_{10} independently is selected from hydrogen, halogen C_{1-4}alkyl, C_{2-4}alkenyl, C_{1-8}alkoxy, phenoxy, phenyl, phenylC_{1-4}alkyl or C_{1-4}alkyl phenyl; and

each R_{11} independently is a significance of R_{10} or R_1;

or both groups R_{11} are hydrogen and both groups R_{10} are attached to carbon atoms ortho to one another and together with the carbon atoms to which they are attached form a carbocyclic or heterocyclic group.

4,876,300

POLYOLEFIN COMPOSITIONS STABILIZED WITH LONG CHAIN N,N-DIALKYLHYDROXYLAMINES

Raymond Seltzer, New City; Ramanathan Ravichandran, Yonkers, and Ambelal R. Patel, Ardsley, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 30, 1987, Ser. No. 139,408

The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.

Int. Cl.[4] C08K *5/32*

U.S. Cl. 524—100 31 Claims

1. A stabilized composition which comprises

(a) a saturated polyolefin or mixture thereof, and

(b) a stabilizing amount of a long chain N,N-dialkylhydroxyamine of the formula

T_1T_2NOH

wherein T_1 and T_2 are independently alkyl of 16 to 18 carbon atoms.

4,876,301

POLYAMIDE COMPOSITION

Erik R. Peerlkamp, Born, and Pieter Gijsman, Beek, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Oct. 1, 1987, Ser. No. 103,367

Claims priority, application Netherlands, Nov. 20, 1986, 8602947

Int. Cl.[4] C08K *3/22*

U.S. Cl. 524—255 4 Claims

1. Polyamide composition with improved stability consisting substantially of tetramethylene adipamide units wherein the composition comprises magnesium-aluminum oxide in an amount of 0.05%–5% (wt) calculated on the polyamide.

4,876,302

POLYURETHANE DISPERSIONS AND THE USE THEREOF AS FINISHING AGENTS

Klaus Noll, Cologne; Wilhelm Thoma, Leverkusen; Klaus Nachtkamp, Cologne; Walter Schröer, Leverkusen, and Josef Pedain, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 54,650, May 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 939,648, Dec. 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 727,049, Apr. 25, 1985, abandoned. This application Dec. 15, 1988, Ser. No. 284,970

Claims priority, application Fed. Rep. of Germany, May 10, 1984, 3417265

Int. Cl.[4] C08K *5/54, 5/06;* C08L *75/04, 75/12*

U.S. Cl. 524—267 15 Claims

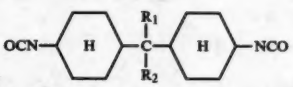
1. An aqueous coating composition based on polyurethane-ureas and having a solids content of about 10 to 70%, said polyurethane-ureas comprising the reaction product of

(A) about 35 to 55% by weight of a polyester diol having a molecular weight of about 500 to 5000,

(B) about 6 to 15% by weight of a low molecular weight diol having from 2 to 10 carbon atoms

(C) about 1 5 to 15% by weight of an anionic group-containing and/or a non-ionic hydrophilic polyoxythylene unit-containing mono- or poly-functional compound with the proviso that any compound which satisfies the requirements of component (C) by containing an anionic group or a non-ionic hydrophilic polyoxythylene unit is included as component (C) and not as a part of components (A), (B), (D), (E), or (F),

(D) about 25 to 45% by weight of a diisocyanate corresponding to the formula



wherein R_1, R_2 and R_3 may be the same or different and represent hydrogen or a straight-chain or branched aliphatic hydrocarbon radical having from 1 to 4 carbon atoms,

(E) about 2 to 9% by weight of an aliphatic diisocyanate or cycloaliphatic diisocyanate other than (D) and

(F) about 0.2 to 4.0% by weight of a polyamine having an average functionally 222 and wherein the aqueous composition additionally contains in physical admixture an alkoxylated dimethyl-polysiloxane having 40 to 150 alkoxy groups and a water-soluble polythylene oxide derivative.

4,876,303

MINERAL-OIL-FREE ENCAPSULANT COMPOSITION

John T. Chapin, Norcross, Ga., and Raffaele A. Sabia, Marboro, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 117,919, Nov. 6, 1987, Pat. No. 4,849,579, which is a continuation of Ser. No. 924,123, Oct. 30, 1986, abandoned, which is a continuation of Ser. No. 728,465, May 1, 1985, abandoned, which is a continuation-in-part of Ser. No. 621,083, Jun. 15, 1984, abandoned. This application Mar. 21, 1989, Ser. No. 326,347

Int. Cl.[4] C08K *5/09*

U.S. Cl. 524—296 9 Claims

1. A mineral-oil-free composition consisting essentially of

(i) 20–60% by weight of a polyurethane formed from at least one isocyanate and at least one polyol, with the balance consisting of ester plasticizer; or

(ii) 20–60% by weight of a polyurethane formed from at least one isocyanate and at least one polyol, with the balance consisting of ester plasticizer and an additive selected from the group consisting of catalysts, fungicides, antioxidants, and mixtures thereof.

4,876,304

POLYVINYL CHLORIDE COMPOSITIONS PLASTICIZED WITH COPOLYESTERS

William J. Mertz, Cincinnati, and Robert J. Braun, Batavia, both of Ohio, assignors to National Distillers and Chemical Corp., Cincinnati, Ohio

Division of Ser. No. 41,503, Apr. 23, 1987, Pat. No. 4,824,990, which is a continuation-in-part of Ser. No. 863,634, May 15, 1986, abandoned. This application Jan. 9, 1989, Ser. No. 294,636

Int. Cl.[4] C08K *5/11*

U.S. Cl. 524—314 17 Claims

1. A polymer composition comprising a polyvinyl chloride homopolymer or polyvinyl chloride copolymer and 30 to 150 parts by weight, per 100 parts resin, of an improved copolyester plasticizer having an average molecular weight of 500 to 2000 and 100° F. kinematic viscosity of 600 to 2000 centistokes obtained by the reaction of (a) a mixture of a benzene dicarboxylic acid, anhydride or methyl ester thereof and an aliphatic saturated dicarboxylic acid having from 5 to 12 carbon atoms or methyl ester thereof, said benzene dicarboxylic acid, anhydride or methyl ester being present in an amount from 40 to 60 equivalent percent, based on the total acid equivalents, (b) a mixture of neopentyl glycol and ethylene glycol, said neopental glycol being present in an amount from 30 to 60 equivalent percent, based on the total alcohol equivalents, and said ethylene glycol being present in an amount from about 30 to 60 equivalent percent, based on the total alcohol equivalents, and (c) an aliphatic saturated monofunctional alcohol having from 6 to 13 carbon atoms or an aliphatic saturated monocarboxylic acid having from 6 to 13 carbon atoms or methyl ester thereof, said aliphatic saturated monofunctional alcohol or aliphatic

saturated monocarboxylic acid being present in ann amount from 8 to 30 equivalent percent, based on the total equivalents of alcohol or acid.

4,876,305

OXIDATION RESISTANT COMPOSITIONS FOR USE WITH RARE EARTH MAGNETS

Anthony M. Mazany, Broadview Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 14, 1987, Ser. No. 132,890
Int. Cl.[4] C08K *3/00*
U.S. Cl. 524—401 **18 Claims**

1. An oxidation resistant composition for a rare earth magnet or magnet material, comprising:

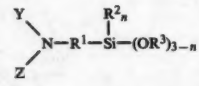
an oxidation resistant coating composition cured in the presence of a rare earth magnet or magnet material, said coating composition comprising;

(1) an amino containing silane,

(2) an epoxy silane, and

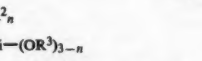
(3) an epoxy resin,

said amino containing silane being an aminosilane or a polyaminosilane having the formula



wherein said R^1 group has from 1 to 30 carbon atoms, wherein said R^1 group is an aliphatic, an aromatic, or combinations thereof, wherein n is 1 or 0, wherein R^2 and R^3, independently, is an aliphatic, an aromatic, or combinations thereof having from 1 to 20 carbon atoms, wherein Y and Z independently is a hydrogen atom, an aminoalkyl group, a polyaminoalkyl group, an aryl group, an alkylalkoxysilane group, or an aminoalkylalkoxysilane group wherein said alkyl group has from 1 to 12 carbon atoms and said alkoxy group has from 1 to 6 carbon atoms,

wherein said epoxy silane compound has the formula



wherein said R^1 group has from 1 to 30 carbon atoms, wherein said R^1 group is an aliphatic, an aromatic, or combinations thereof, wherein n is 1 or 0, wherein R^2 and R^3, independently, is an aliphatic, an aromatic, or combinations thereof having from 1 to 20 carbon atoms, and wherein T is an epoxycyclohexyl group, a glycidoxy group, or an alkyl derivative thereof, and

the amount of said amino containing silane and said epoxy silane in said coating composition each being from about 5 to about 70 parts by weight per 100 parts by weight of said coating composition, and the amount of said epoxy compound being from about 5 parts to about 90 parts by weight per every 100 parts by weight of said coating composition.

4,876,306

PROCESS FOR PREPARING A THERMOPLASTIC RESIN

Satoshi Kurokawa, Iwakuni; Suehiro Tayama, Ohtake, and Fumio Sato, Abiko, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 167,953
Claims priority, application Japan, Mar. 16, 1987, 62-60484
Int. Cl.[4] C08K *3/30*; C08F *2/00*
U.S. Cl. 524—423 **6 Claims**

1. A process for preparing a thermoplastic resin, which comprises polymerizing a monomer mixture containing at least 80% by weight of at least one member selected from the group consisting of an alkyl methacrylate, an alkyl acrylate, an aromatic vinyl compound, acrylonitrile, methacrylonitrile and butadiene by using as an emulsifier a compound having a group of the formula $—PO_3M_2$ or $—PO_2M$ wherein M is an alkali metal or an alkaline earth metal, to form a latex, and contacting the latex with an aqueous magnesium sulfate solution having a concentration of from 0.1 to 30% by weight.

4,876,307

POLYMER PROCESSING

Robert C. Allen, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 107,192, Oct. 13, 1987, Pat. No. 4,761,453. This application Mar. 18, 1988, Ser. No. 170,593
Int. Cl.[4] C08J *0/00*
U.S. Cl. 524—612 **9 Claims**

1. A method of improving the thermal processability of a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon which comprises saturating said polymer with water at the melting point of the substantially saturated polymer but at a temperature below the melting point of the polymer.

4,876,308

POLYURETHANE ADHESIVE FOR A SURFACE TREATMENT-FREE FIBER REINFORCED PLASTIC

Earl G. Melby, Uniontown, and H. William Cocain, Cuyahoga Falls, both of Ohio, assignors to GenCorp Inc., Akron, Ohio

Filed Feb. 18, 1988, Ser. No. 158,005
Int. Cl.[4] C08L *75/04*
U.S. Cl. 524—780 **21 Claims**

1. A two component urethane adhesive, comprising:

a urethane prepolymer component and a curative component, said urethane prepolymer component made from a hydroxyl terminated intermediate and a polyisocyanate, the amount of said polyisocyanate being an equivalent excess of at least 2.0 based upon the hydroxyl terminated intermediate so that said prepolymer component has free NCO groups, said curative component comprising a nitrogen-free polyether polyol having OH groups, a nitrogen-free polyester polyol having OH groups, a nitrogen-free low molecular weight polyol, or combinations thereof and a primary polyamine, the amount of said polyol curative being such that the equivalent ratio of said free NCO groups to said OH groups and NH groups of said curative is from about 1.2 to about 2.0, the two component urethane adhesive being capable of bonding to a surface treatment-free plastic, fiber reinforced plastic, or metal.

4,876,309

ENHANCING COLOR STABILITY TO STERLIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Brasschaat, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Dec. 22, 1987, Ser. No. 136,682
Int. Cl.[4] C08K *5/15*
U.S. Cl. 524—109 **21 Claims**

1. A composition comprising an aromatic carbonate polymer in admixture with an effective amount of a stabilizing pyran compound effective to inhibit yellowing upon exposure to sterilizing radiation wherein said pyran compound is 3,4-dihydro-2-ethoxy-2H-pyran.

8. A composition comprising an aromatic carbonate polymer in admixture with an effective amount of a stabilizing pyran compound effective to inhibit yellowing upon exposure to sterilizing radiation wherein said stabilizing pyran compound is selected from the group consisting of hydrogenated pyran, nonhydrogenated pyran, substituted pyran and unsubstituted

pyran wherein said substituted groups on the substituted pyran are selected from the group consisting of alkyl, aryl, alkoxy, and aryloxy, said substituted groups being positioned on any carbon atom in the pyran ring.

4,876,310

HYDROCARBON RESIN/POLYPHENYLENE ETHER COMBLIKE POLYMERS, METHODS OF PRODUCING THESE POLYMERS, AND THEIR MIXTURES WITH POLYPHENYLENE ETHERS

Martin Bartmann, Recklinghausen, Fed. Rep. of Germany, assignor to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Feb. 28, 1986, Ser. No. 834,423

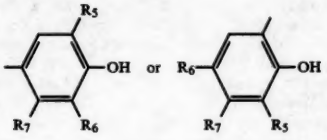
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509093

Int. Cl.[4] C08F *16/12, 71/04*

U.S. Cl. 525—149 **23 Claims**

1. A method for preparing a modified polyphenylene ether polymer, comprising:

(1) combining (1a) an ortho-substituted phenol, (1b) a copper amine oxidative coupling catalyst, and (1c) a hydrocarbon resin having at least one side group of the formulae



wherein R_7 is independently a hydrogen atom and R_5, R_6 and R_7 are each independently a halogen atom, a phenyl group, or a C_{1-6}-n-alkyl group, and wherein the hydrocarbon resin is (i) an ethylene-propylene-unconjugated diene terpolymer or a polyalkenylene and (ii) contains at most 20 carbon-carbon double bonds per 100 carbon-carbon bonds; and

(2) obtaining a mixture of a polyphenylene ether and a hydrocarbon resin/polyphenylene ether comblike polymer.

4,876,311

OPAQUE SYNTHETIC RESINS

Jürgen Hennig, Darmstadt; Heinz Vetter, Rossdorf, and Manfred Munzer, Bensheim, all of Fed. Rep. of Germany, assignors to Rohm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 893,808, Aug. 6, 1986, abandoned. This application Mar. 1, 1988, Ser. No. 166,726

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528165

Int. Cl.[4] C08L *33/06, 69/00*

U.S. Cl. 525—229 **3 Claims**

1. An opaque synthetic resin comprising (a) a polymer matrix selected from the group consisting of polystyrene, polyvinyl chloride, polyvinyl acetate, polycarbonate, polyolefins and acrylic resins and (b) cross-linked beads wherein

said cross-linked beads are prepared by bead polymerization in aqueous media, isolated from said aqueous media and then added to said polymer matrix in an extruder, said polymer matrix being in a molten state, and extruded to produce said opaque synthetic resin, wherein

said polymer matrix comprises 1–30 wt.% of said cross-linked beads relative to said polymer matrix and wherein said cross-linked beads consist essentially of 9.9–59.9 wt.% styrene, 90–40 wt.% methylmethacrylate, and 0.1–20 wt.% of at least one cross-linking monomer, and wherein the refractive index of said bead polymer is higher than the refractive index of said polymer matrix, and wherein the average size of said cross-linked beads is within the range of 5–50 microns.

4,876,312

PROCESS FOR PREPARING RUBBER-MODIFIED STYRENIC POLYMER COMPOSITIONS CONTAINING HYDROPEROXIDE DERIVATIVES OF RUBBERY POLYMERS

Bernard J. Meister, Auburn; Craig D. Dryzga, Bay City, and Li C. Tien, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 23, 1987, Ser. No. 28,856

Int. Cl.[4] C08F *4/34, 4/36, 279/04, 291/18*

U.S. Cl. 525—263 **5 Claims**

1. In a process wherein a rigid phase polymer is prepared by polymerization solution of one or more free radically polymerizable monomers in the presence of a hydroperoxidized rubbery intermediate, the improvement wherein the phase inversion and particle sizing is conducted in a well stirred backmixed reactor operating under essentially homogeneous conditions at a solids content of from about 30 to about 75 percent by weight, and by use of a feed stream having an initial rubber content based on monomer content of from about 5 to about 12 percent by weight.

4,876,313

GRAFTED CORE-SHELL POLYMER COMPOSITIONS USING POLYFUNCTIONAL COMPOUNDS

Dennis P. Lorah, Lansdale, Pa., assignor to Rohm and Haas Company

Filed Aug. 29, 1986, Ser. No. 902,264

Int. Cl.[4] C08F *265/06, 2/24*

U.S. Cl. 525—281 **23 Claims**

1. A composition comprising a core-shell polymer having an alkali-insoluble polymer core and a alkali-soluble polymer shell, wherein said core and said shell have been substantially chemically grafted together, said shell and said core being prepared sequentially be emulsion polymerization, and said shell is polymerized from a mixture of monomers comprising about 10 to about 60% by weight acid-containing or anhydride-containing unsaturated monomer wherein the ratio of said core to said shell is about 85:15 to about 15:85, said core having a weight average molecular weight of greater than about 8,000 and said shell having a weight average molecular weight of about 5,000 to about 100,000 as determined by gel permeation chromatography.

4,876,314

HYDROGENATION PROCESS

Ronald J. Hoxmeier, Houston, and Lynn H. Slaugh, Cypress, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 9, 1988, Ser. No. 269,034

Int. Cl.[4] C08F *8/04*

U.S. Cl. 525—338 **12 Claims**

1. A process for selectively hydrogenating a polymer comprising ethylenic unsaturation and cyano groups comprising the steps of:

(a) contacting a polymer comprising ethylenic unsaturation and cyano groups with hydrogen in a first suitable solvent and in the presence of a catalyst prepared by combining one or more palladium compounds with one or more alkylalumoxanes in a second suitable solvent, which second suitable solvent may be the same or different from said first suitable solvent;

(b) maintaining the contact in step (a) for a sufficient period of time to permit conversion of at least a portion of the ethylenic unsaturation contained in said polymer; and

(c) recovering an at least partially hydrogenated polymer.

4,876,315

PROCESS FOR VULCANIZING SATURATED ELASTOMERS WITH HALOGEN CURE SITES

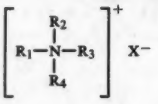
John M. Hoyt, Cincinnati, and Steven D. Blazey, Akron, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Division of Ser. No. 938,667, Dec. 5, 1986, abandoned. This application Jun. 6, 1988, Ser. No. 221,241

Int. Cl.[4] C08F 8/34

U.S. Cl. 525—346 5 Claims

1. A process for vulcanizing a saturated elastomer having active halogen-containing cure sites selected from the group consisting of copolymers of ethylene and a vinyl ester of from 3 to 6 carbon atoms and having active halogen-containing cure sites incorporated therein by polymerizing a vinyl monomer containing said halogen-containing group or by chemically modifying the copolymer by reacting a portion of the ester groups with a halogen-containing reagent and poly(ethyl acrylate) or a copolymer or ethyl acrylate with n-butyl acrylate and having active halogen-containing cure sites incorporated therein by copolymerizing or terpolymerizing a vinyl monomer containing said halogen-containing group which comprises combining said elastomer with 0.05 to 2.5 sulfur and 0.05 to 7 phr quaternary ammonium salt corresponding to the formula



wherein R_1, R_2, R_3 and R_4 are hydrocarbon radicals having from 1 to 18 carbon atoms and X^- is Cl^-, Br^-, I^-, HSO_4^-, or H_2PO_4 and hating said mixture at a temperature from about 100° C. to about 250° C. to effect vulcanization.

4,876,316

HIGH TEMPERATURE MAGNET WIRE BOND COAT POLYAMIDE/ALDEHYDE/AROMATIC ALCOHOL REACTION PRODUCT

Francois A. Lavallee, Fort Wayne, Ind., assignor to Essex Group, Inc., Fort Wayne, Ind.

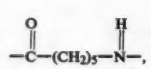
Division of Ser. No. 78,441, Jul. 27, 1987, abandoned. This application Mar. 24, 1988, Ser. No. 173,336

Int. Cl.[4] C08G 69/50

U.S. Cl. 525—427 11 Claims

1. A magnet wire bondcoat consisting essentially of the polyamide reaction product of:

(1) a polyamide having recurring units of the formula



(2) R—CHO wherein R is an aliphatic moiety, and

(3) an aromatic alcohol selected from the group consisting of phenols, cresols or alkylated phenols.

4,876,317

AMIDE-UREA COPOLYMER AND PROCESS FOR THE PREPARATION THEREOF

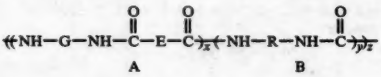
Kenneth P. Blackmon, Mobile, Ala.; Donald C. Clagett, Pittsfield, Mass.; Daniel W. Fox, Pittsfield, Mass.; Louis M. Maresca, Pittsfield, Mass., and Sheldon J. Shafer, Phoenix, Ariz., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 30, 1987, Ser. No. 139,482

Int. Cl.[4] C08G 69/48, 71/02

U.S. Cl. 525—433 7 Claims

1. A block copolymer having recurring units of the general formula:



comprising segments of repeating units A and segments of repeating units B wherein units A comprise from about 1 to about 99 percent by weight of said copolymer and units B comprise from about 99 to about 1 percent by weight of said copolymer, where E is selected from (1) divalent alkylene, arylene, cycloalkylene, arylalkylene, alkylarylene groups of from 2 to 30 carbon atoms or a mixture of any of the foregoing, or (2) substituted with at least one chlorine, bromine, fluorine, nitro, nitrile, alkylene of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms or aryl of from 6 to 20 carbon atoms; G is selected from (1) divalent alkylene, arylene, cycloalkylene, arylalkylene or alkylarylene groups of from about 2 to about 30 carbon atoms or a mixture of any of the foregoing, or (2) interrupted with alkylene, arylene, carbonyl, ether, imino or sulfur-containing groups, or (3) interrupted with alkylene, arylene, carbonyl, ether, imino or sulfur-containing groups substituted with at least one of chlorine, bromine, flourine, nitro, nitrile, alkylene of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms or arylene of from 6 to 20 carbon atoms; R is as defined for G and x, y and z are each integers of 1 to 100,000.

4,876,318

ORGANOALUMINUM COUPLING AGENTS AND FILLED POLYMER COMPOSITIONS THEREOF

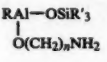
Dennis B. Malpass, LaPorte, Tex.; Kelly B. Triplett, Stamford, Conn., and Andrzej M. Piotrowski, Thornwood, N.Y., assignors to Texas Alkyls, Inc., Deer Park, Tex.

Filed Jul. 19, 1988, Ser. No. 221,390

Int. Cl.[4] C08K 5/56; C07F 7/10, 5/06

U.S. Cl. 525—446 8 Claims

1. Compounds of the formula



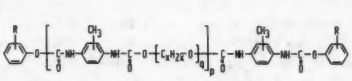
where R is alkyl, R′ is independently selected from alkyl and aryl, and n ranges from 1–8.

4. A filled polymer comprising a polymer substrate, filler, and a compound as claimed in claim 1 as a coupling agent.

4,876,319
SYNTHETIC RESIN COMPOSITION, SUBSTRATE MATERIAL FOR PRINTED CIRCUIT BOARDS AND METHOD OF MANUFACTURING A SYNTHETIC RESIN COMPOSITION

Johannes M. M. Simons, Sittard, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jun. 22, 1987, Ser. No. 64,359
Claims priority, application Netherlands, Jul. 14, 1986, 8601829
Int. Cl.[4] C08F *283/04;* C08L *61/00*
U.S. Cl. 525—456 9 Claims



1. A method of manufacturing a synthetic resin composition which comprises an interpolymer of a phenol-formaldehyde resin and polyurethane which comprises reacting a phenol and a formalehyde-producing compound in the presence of a polyurethane and a basic catalyst.

4,876,320
PROCESS FOR REDUCING SHEETING DURING POLYMERIZATION OF ALPHA-OLEFINS

Bernard D. Fulks, Victoria, Tex.; Steven P. Sawin; Collin D. Aikman, both of Charleston, W. Va., and John M. Jenkins, III, South Charleston, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Division of Ser. No. 730,958, May 6, 1985, Pat. No. 4,792,592, which is a continuation of Ser. No. 650,571, Sep. 14, 1984, Pat. No. 4,532,311, which is a continuation of Ser. No. 247,990, Mar. 26, 1981, abandoned. This application Sep. 20, 1988, Ser. No. 246,623
The portion of the term of this patent subsequent to Jul. 30, 2002, has been disclaimed.
Int. Cl.[4] G08F *2/34*
U.S. Cl. 526—62 10 Claims

1. In method for polymerization of one or more alpha-olefins in a gas fluidized bed reactor in the presence of a catalyst prone to cause sheeting, the improvement which comprises maintaining the static electric charge in said reactor at the site of possible sheet formation below static voltage levels which could otherwise cause sheet formation.

4,876,321
PREPARATION OF ALPHA-OLEFIN POLYMERS OF RELATIVELY NARROW MOLECULAR WEIGHT DISTRIBUTION

Frederick Y. Lo, Yanbu Al Sinaiyah, Saudi Arabia; Thomas E. Nowlin, Somerset, and Margaret M. Wu, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 815,845, Jan. 3, 1986, Pat. No. 4,668,650. This application Feb. 20, 1987, Ser. No. 17,285
Int. Cl.[4] C08F *4/02, 10/02*
U.S. Cl. 526—129 34 Claims

1. A process for preparing a polymer of at least one C_2–C_{10} alpha-olefin, the polymer having a density of 0.94 g/cc or less, comprising conducting the polymerization in the presence of a catalyst prepared by a process comprising the steps of:

(i) contacting a solid, porous carrier having reactive OH groups with an ether containing at least one organomagnesium composition having the empirical formula:

$$R_nMgR'_{(2-n)}$$

where R and R′ are the same or different C_1–C_{12} hydrocarbyl groups, provided that R′ may also be a halogen and n is 0, 1, or 2, the number of moles of said organomagnesium composition being in excess of the number of moles of said OH groups on said carrier, whereby said organomagnesium composition is reacted with said OH groups on said carrier;

(ii) removing said ether, whereby a supported magnesium (Mg) composition in the form of a solid powder is formed;

(iii) drying said solid powder, without washing or rinsing thereof, until it comprises not more than about 6% by weight of the ether;

(iv) contacting the product of step (iii) with at least one hydrocarbyl alcohol of the formula R″OH wherein R″ is a C_1–C_{10} alkyl, alkenyl, aryl, alkaryl or aralkyl group;

(v) contacing the product of step (iv) with a titanium compound soluble in a non-polar solvent, the number of moles of said titanium compound being such that the molar ratio of titanium (Ti) to magnesium (Mg) is about 0.3 to about 0.9, both the Ti and Mg being calculated as elemental metals, said supported magnesium composition being substantially insoluble in said non-polar solvent, whereby a reacted form of titanium which is insoluble in said non-polar solvent becomes supported on said carrier;

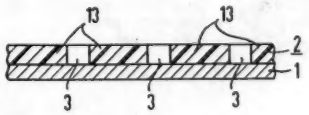
(vi) removing said non-polar solvent without washing or rinsing of the product of step (v); and

(vii) activating the product of the step (vi) with a catalyst activator containing compounds of Group IB, IIA, IIB, IIIB or IVB of the Periodic Chart of the Elements.

4,876,322
IRRADIATION CROSS-LINKABLE THERMOSTABLE POLYMER SYSTEM, FOR MICROELECTRONIC APPLICATIONS

Klaus Budde, Unterhaching; Friedrich Koch, Munich, and Ferdinand Quella, Neubiberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesselschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 762,513, Aug. 5, 1985, Pat. No. 4,732,843. This application Sep. 4, 1987, Ser. No. 93,212
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429606
Int. Cl.[4] C08F *14/18*
U.S. Cl. 526—242 1 Claim



1. A method for manufacturing a thermostable polymer system cross-linkable by irradiation which is used for manufacturing microelectronic circuits with multilayer wiring comprising the steps of:

(A) reacting an irradiation sensitive acid chloride of at least one acid selected from the group consisting of cinnamic acid, acrylic acid, and methacrylic acid, with a linear fluorinated oligomer having at least two reactive and groups for the reaction with the acid chloride, and

(B) reacting a resulting product with at least one irradiation sensitive ester of said acid and a multifunctional alcohol by irradiation, whereby the mole ratio of said resulting product to said ester is at least about 10:1.

4,876,323

α-SUBSTITUTED ACRYLIC ACID ESTERS, THEIR POLYMERS AND METHOD OF SYNTHESIZING SAME

James F. Engel; Thomas J. Byerley, and Howard W. Christie, all of Jackson County, Mo., assignors to Midwest Research Institute, Kansas City, Mo.

Continuation of Ser. No. 583,678, Feb. 27, 1984, Pat. No. 4,704,466. This application Jun. 11, 1987, Ser. No. 60,527

Int. Cl.[4] C08F *126/00*

U.S. Cl. 526—310 11 Claims

1. A composition comprising: the product of copolymerization of N-vinyl-2-pyrrolidone and R-α-isocyantoacrylate where R is selected from the group consisting of C_1 to C_5 alkyls and benzyl.

4,876,324

HIGH MOLECULAR WEIGHT ORTHO CRESOL-NOVOLAK RESINS AND PROCESS FOR THE PREPARATION THEREOF USING ALCOHOLIC OR ACIDIC ORGANIC SOLVENTS

Yoshitomo Nakano, and Masumi Kada, both of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Division of Ser. No. 741,138, Jun. 4, 1985, abandoned. This application May 13, 1987, Ser. No. 49,335

Claims priority, application Japan, Jun. 8, 1984, 59-116510

Int. Cl.[4] C08G *8/12*

U.S. Cl. 528—142 11 Claims

1. A process for preparing a high molecular weight cresol-novolak resin having a softening point of 30° C. or higher, consisting essentially of polycondensing orthocresol or a mixture of orthocresol and paracresol with an aldehyde compound or a derivative thereof in a solvent selected from the group consisting of $C_{3\text{-}12}$ aliphatic monoalcohols, $C_{3\text{-}6}$ monohydric glycol ethers and benzyl alcohol, in the presence of a protonic acid catalyst.

4,876,325

POLYIMIDE RESIN FROM BIS-IMIDE, POLYPHENOL AND DICYANDIAMIDE

Larry D. Olson, Viroqua, and Eugene P. Pallardy, Jr., La Crosse, both of Wis., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

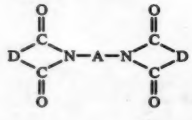
Filed Apr. 28, 1988, Ser. No. 187,158

Int. Cl.[4] C08G *73/10*

U.S. Cl. 528—170 14 Claims

1. A thermosetting resin composition substantially free of a polymerization catalyst consisting essentially of:

(a) a bisimide having the formula:



where:

A represents alkylene radicals having 1 to 20 carbon atoms, cycloalkylene radicals having 4 to 40 carbon atoms, heterocyclic radicals containing at least one of O, S, and N, phenylene or polycyclic aromatic radicals.

D represents divalent radicals containing a carboncarbon double bond

(b) a polyphenol;

(c) dicyandiamide, where the weights of (a), (b), and (c) are 80 to 98%/1 to 10%/and 0.1 to 10%, respectively, based on the total weight of (a), (b), and (c).

4,876,326

SOLID STATE POLYMERIZATION OF POLYESTER PREPOLYMERS

Verne R. Rinehart, McArthur, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 30,319, Mar. 26, 1987, Pat. No. 4,755,587. This application Mar. 11, 1988, Ser. No. 161,312

The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.

Int. Cl.[4] C08G *63/02*

U.S. Cl. 528—272 24 Claims

1. In a process for solid state polymerizing a polyester prepolymer into a high molecular weight polyester resin at an elevated temperature, the improvement which comprises utilizing a polyester prepolymer which is in the form of porous pills, wherein the porous pills were made by compacting a powder or the polyester prepolymer having a particle size of less than about 841 microns; wherein the elevated temperature is within the range of about 50? C. below the sticking temperature of the polyester prepolymer up to but not including the sticking temperature of the polyester prepolymer.

4,876,327

AROMATIC POLYESTER

Bindert K. Vriesema, Sittard, Netherlands, and Francesco Miniaci, Genk, Belgium, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed May 11, 1988, Ser. No. 192,626

Claims priority, application Netherlands, May 13, 1987, 8701135

Int. Cl.[4] C08G *63/60*

U.S. Cl. 528—173 12 Claims

1. An aromatic polyester having liquid crystalline properties and a reduced melting temperature, characterized in that the polyester comprises (1) repeating aromatic units having at least one oxo group in the polymer chain linkage, said aromatic units containing at least one aromatic ring consisting of carbon atoms, and (2) repeating heterocyclic units, said heterocyclic units having two carbonyl groups and being linked to said aromatic units through a carboxylic ester linkage, and said heterocyclic units being derived from pyridine, pyrrole, thiophene or furan dicarboxylic acids and esters thereof.

4,876,328

POLYAMIDE COMPOSITION

Hyman R. Lubowitz, Rolling Hills Estates, Calif., and Clyde H. Sheppard, Bellevue, Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 51,884, May 18, 1987, which is a continuation-in-part of Ser. No. 865,228, May 20, 1986, which is a division of Ser. No. 865,228, May 20, 1986, which is a continuation-in-part of Ser. No. 781,847, Sep. 30, 1985. This application Jun. 12, 1987, Ser. No. 61,938

Int. Cl.[4] C08G *69/26*

U.S. Cl. 528—322 51 Claims

1. A composition of matter, comprising a compound selected from the group consisting of:

E—CONH—P—NHCO—$_m$—E;

E—NHCO—Q—CONH—$_m$—E;

Ar—$_n$;

Ar—$_n$;

Ar—$_n$;

Ar—$_n$;

Ar—$_n$; or

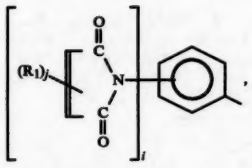
Ar—$_n$;

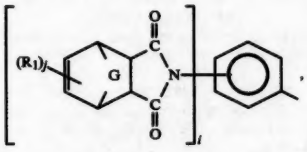
wherein m is a small integer;

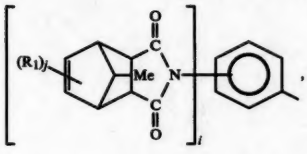
Ar is an aromatic moiety;

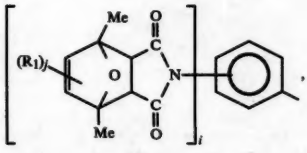
n is 3 or 4;

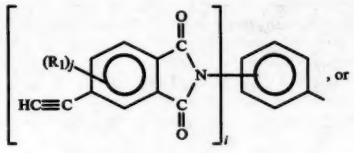
E is a crosslinkable end cap monomer for improving solvent resistance of the cured oligomer in an the advanced composite selected from the group consisting of:

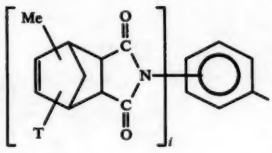












R_1 is lower alkyl, lower alkoxy, aryl, aryloxy, substituted alkyl, substituted aryl, halogen, or mixtures thereof;
j is 0, 1, or 2;
i is 1 or 2;
Me is methyl;
G is $-CH_2-$, $-O-$, $-S-$, or $-SO_2-$;
T is allyl or methallyl;
P is a linear, aromatic, organic, divalent residue of a diamine; and
Q is a linear, aromatic, organic, divalent residue of a diacid halide or dicarboxylic acid.

4,876,329

POLYIMIDE POLYMERS AND COPOLYMERS USING 3,5-DIAMINOBENZOTRIFLUORIDE

Weilong L. Chiang; Douglas E. Fjare, and Neal R. Nowicki, all of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Jun. 28, 1988, Ser. No. 212,508
Int. Cl.[4] C08G *69/26*
U.S. Cl. 528—353 **8 Claims**

1. A partially soluble, film-forming polyimide or copolyimide made from 3,5-diaminobenzotrifluoride.

4,876,330

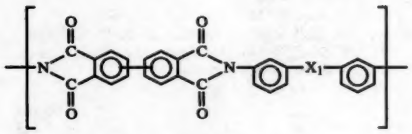
COLORLESS TRANSPARENT POLYIMIDE SHAPED ARTICLE AND PROCESS FOR PRODUCING THE SAME

Kazumi Higashi, and Yuzuru Noda, both of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 10, 1986, Ser. No. 837,987
Claims priority, application Japan, Mar. 10, 1985, 60-46943; Jul. 11, 1985, 60-152990; Jan. 18, 1986, 61-8386
Int. Cl.[4] C08G *69/26*
U.S. Cl. 528—353 **17 Claims**

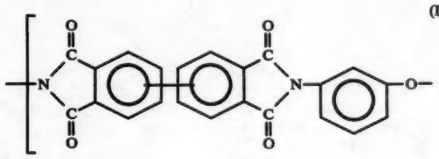
1. A colorless transparent polyimide shaped article comprising as a main component at least one recurring unit selected from the group consisting of a recurring unit of the formula (I)

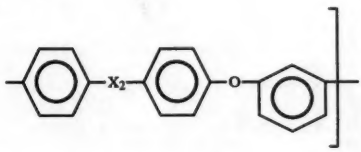
(I)



wherein X_1 represents O, S, SO_2, CH_2, CF_2, $C(CH_3)_2$, $C(CF_3)_2$ or CO;
a recurring unit of the formula (II)

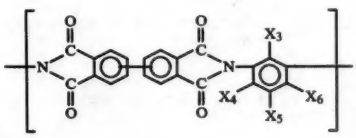
(II)





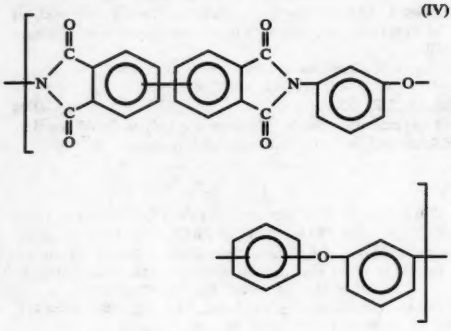
wherein X_2 represents SO_2, $C(CH_3)_2$ or $C(CF_3)_2$;
a recurring unit of the formula (III)

(III)



wherein X_3, X_4, X_5 and X_6 which may be the same or different

each represents H, F, Cl, CH_3, C_2H_5, NO_2 or CF_3; and a recurring unit of the formula (IV)



(IV)

4,876,331

COPOLYESTER AND PROCESS FOR PRODUCING THE SAME

Yoshiharu Doi, Yokohama, Japan, assignor to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Aug. 10, 1988, Ser. No. 230,461

Claims priority, application Japan, Aug. 18, 1987, 62-204537; Aug. 18, 1987, 62-204538; Dec. 15, 1987, 62-316446; Mar. 2, 1988, 63-49015; Jul. 18, 1988, 63-178448

Int. Cl.[4] C08G *63/02;* **C08H** *5/00*

U.S. Cl. 528—361 **4 Claims**

1. A copolyester comprising a 3-hydroxybutyrate unit and one selected from the group consisting of (1) a 3-hydroxyvalerate unit and a 5-hydroxyvalerate unit, (2) a 4-hydroxybutyrate unit and (3) a 4-hydroxybutyrate unit and a 3-hydroxyvalerate unit, the intrinsic viscosity of said copolyester being in the range of 0.4 to 10.0 dl/g in chloroform at 30° C.

4,876,332

POLYPEPTIDES WITH TYPE IV COLLAGEN ACTIVITY

Effie C. Tsilibary, and Leo T. Furcht, both of Minneapolis, Minn., assignors to Regents of the Univeristy of Minnesota, Minneapolis, Minn.

Filed Oct. 8, 1987, Ser. No. 106,858

Int. Cl.[4] C07K *7/06, 7/08*

U.S. Cl. 530—326 **4 Claims**

1. A composition consisting essentially of a polypeptide of the formula:

met-phe-lys-lys-pro-thr-pro-ser-thr-leu-lys-ala-gly-glu-leu-arg,

thr-ala-gly-ser-cys-leu-arg-lys-phe-ser-thr met,

asn-pro-leu-cys-pro-gly-thr-lys-ile-leu,

or mixtures thereof.

4,876,333

β-CRYSTALLINE MODIFICATION OF DIASAZO ACID DYESTUFF

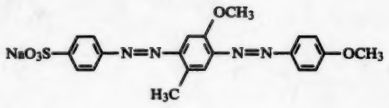
Alfred Hoehener, and Roy E. Smith, both of Toms River, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 15, 1985, Ser. No. 787,354

Int. Cl.[4] C09B *67/24, 67/48, 67/54;* **D06P** *1/39*

U.S. Cl. 534—575 **3 Claims**

1. The β-crystalline form of the dyestuff of the formula



displaying Debye-Scherrer X-ray diffraction pattern reflections representative of d-spacings (Å) as follows: 13.6(medium), 5.2(very strong), 4.9(very strong), 4.8(strong), 4.7(strong), 4.55(medium), 4.4(medium), 4.35(medium), 3.8(very strong), 3.7(medium), 2.95(very strong).

4,876,334

TRIAZINYL REACTIVE DYES IN WHICH THE TRIAZINYL IS FURTER SUBSTITUTED WITH A REACTIVE RADICAL

Athanassios Tzikas, Pratteln, and Paul Herzig, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

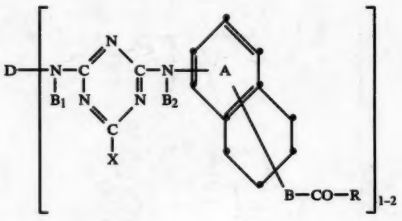
Filed Feb. 1, 1988, Ser. No. 150,695

Claims priority, application Switzerland, Feb. 6, 1987, 445/87

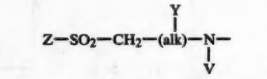
Int. Cl.[4] C09B *62/02, 62/04, 62/443, 62/503*

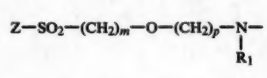
U.S. Cl. 534—632 **29 Claims**

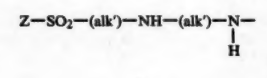
1. A reactive dye of the formula



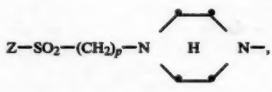
in which D is the radical of a monoazo, polyazo, metal complex azo, anthraquinone, phthalocyanine, formazane, azomethine, dioxazine, phenazine, stilbene, triphenylmethane, xanthene, thioxanthone, nitroaryl, naphthoquinone, pyrenequinone or perylenetetracarbimide dye, B_1 and B_2 are independently of each other hydrogen or C_1–C_4-alkyl which is unsubstituted or is further substituted by halogen, hydroxyl, cyano, C_1–C_4-alkoxy, C_1–C_4-alkoxy-carbonyl, carboxyl, sulfamoyl, sulfo or sulfato, X is fluorine, chlorine, bromine, sulfo, C_1–C_4-alkylsulfonyl or phenylsulfonyl, B is $—CH_{2n}$ or $—O—CH_{2n}$, n is 1 to 6, R is



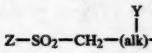




or



Z is β-sulfatoethyl, β-thiosulfatoethyl, β-phosphatoethyl, β-acetoxyethyl, β-haloethyl or vinyl, alk is alkylene having 1 to 6 carbon atoms or a branched isomer thereof, Y is hydrogen, chlorine, bromine, fluorine, hydroxyl, sulfato, alkanoyloxy of up to 4 carbon atoms, cyano, carboxyl, C_1–C_5-alkoxy-carbonyl, carbamoyl, or $—SO_2—Z$, in which Z is as defined above, V is hydrogen of C_1–C_4-alkyl which is unsubstituted or is substituted by carboxyl, sulfo, sulfamoyl, N-(C_1–C_2-alkyl)-sulfamoyl, N,N-di-(C_1–C_2-alkyl)-sulfamoyl, C_1–C_2-alkoxy, halogen or hydroxyl, or



in which Z, alk and Y are as defined above, R_1 is hydrogen or C_1–C_6-alkyl, the alk's are independently of each other polymethylene radicals having 2 to 6 carbon atoms or branched isomers thereof, m is 1 to 6, p is 1 to 6, and q is 1 to 6, and the benzene or naphthalene radical A is unsubstituted or substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, alkanoylamino having up to 8 carbon atoms, benzoylamino, amino, C_1–C_4-alkylamino, phenylamino, N,N-di-(β-hydroxyethyl)-amino, N,N-di-(β-sulfatoethyl)-amino, sulfobenzylamino, N,N-disulfobenzylamino, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkysulfonyl, trifluoromethyl, nitro, cyano, halogen, carbamoyl, N-C_1–C_4-alkyl-carbomoyl sulfamoyl, N-C_1–C_4-alkyl-sulfamoyl, N-β-hydroxyethylsulfamoyl, N,N-di-(β-hydroxyethyl)-sulfamoyl, N-phenylsulfamoyl, ureido, hydroxyl, carboxyl, sulfomethyl or sulfo.

4,876,335

POLY-LABELLED OLIGONUCLEOTIDE DERIVATIVE

Akio Yamane; Tatsuro Kawasoe; Noriko Tsukumo, and Kenichi Miyoshi, all of Hiroshima, Japan, assignors to Wakunaga Seiyaku Kabushiki Kaisha, Osaka, Japan

Filed Jun. 30, 1987, Ser. No. 67,798

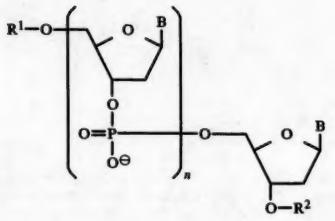
Claims priority, application Japan, Jun. 30, 1986, 61-153343

Int. Cl.[4] C07H *19/10, 19/20*

U.S. Cl. 536—27 **21 Claims**

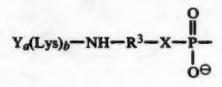
1. A poly-labelled oligonucleotide derivative represented by the following formula [I]:

[I]



wherein: either one of R^1 and R^2 is a group represented by the formula [II] shown below and the other is a hydrogen atom or a phosphate group, or both of R^1 and R^2 are groups represented by the formula [II] shown below; n is a natural number from 6 to 200; and B is nucleotide base selected from the group consisting of adenine, thymine, cytosine and guanine;

[II]



wherein: a is a natural number from 2 to 50 and b is a natural number from 1 to 50, with $b+1 \geqq a$; R^3 is an alkylene group having 2 to 20 carbon atoms; X represents an oxygen atom or an imino group; $(Lys)_b$ represents a lysine moiety when b=1 and a polylysine moiety when b=2 to 50, wherein said polylysine is a polymerization product of lysine through the reaction of its amino group and its carboxylic group with the number of molecules of lysine polymerized therein being equal to b, and wherein $(Lys)_b$ is bonded to the moiety —NH— in formula [II] through reaction of the carboxylic group in the $(Lys)_b$ moiety; Y is a label which is selected from the group consisting of biotin, haptens, fluorophores, and chemiluminescent substances, and which is covalently bonded to the $(Lys)_b$ moiety through reaction with the amino group or groups in the $(Lys)_b$ moiety.

4,876,336

AMPHOTERIC STARCHES AND PROCESS FOR THEIR PREPARATION

Daniel B. Solarek, Bridgewater; Teresa A. Dirscherl, N. Plainfield; Henry R. Hernandez, Bridgewater, and Wadym Jarowenko, Green Brook, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 896,546, Aug. 13, 1986, abandoned. This application May 18, 1987, Ser. No. 50,649

Int. Cl.[4] C08B *31/02, 33/02, 35/02*

U.S. Cl. 536—109 **15 Claims**

1. A process for preparing an amphoteric starch derivative which comprises:

(a) providing an aqueous slurry of a non-degraded starch derivative containing tertiary amino or quaternary ammonium cationic substituent groups having a D.S. of from about 0.010 to 0.080,

(b) adjusting the pH level of the slurry to about pH 5.5–8.5,

(c) adding to the aqueous starch slurry a phosphate salt selected from the group consisting of tripolyphosphate, hexametaphosphate, and pyrophosphate alkali metal salts, while maintaining the pH level at 5.5–8.5,

(d) filtering the slurry,

(e) drying the resultant cake to a moisture of 9.0% or below,

(f) heat reacting the dried starch at a temperature of about 110°–140° C. for a period of 0.1 to 4.0 hours, and

(g) recovering the amphoteric starch derivative, wherein the resultant starch derivative has a bound phosphorus content of at least 0.12%, a viscosity of at least 800 cps, and a ratio of anionic to cationic groups of from about 0.12 to 0.55.

4,876,337

METHOD AND APPARATUS FOR THE PREPARATION OF CYANOALKYL-ALKOXYSILANES

Hartwig Rauleder; Claus-Dietrich Seiler, both of Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, all of Fed. Rep. of Germany, assignors to Huels Troisdorf AG, Troisdorf, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 278,736

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744211

Int. Cl.[4] C07F *7/10*

U.S. Cl. 556—415 **2 Claims**

1. In a method of preparing a cyanoalkyl-akoxysilane by reacting a chloroalkyl-akoxysilane with an alkali cyanide or an alkaline earth metal cyanide in a solvent, separating the alkali metal chloride thus produced and removing the solvent and the cyanoalkyl-akoxysilane by distillation, the improvement of performing all of the process steps in a single apparatus and, after the reaction is performed, first distilling the solvent out of the apparatus through a column connected thereto, then distilling most of the cyanoalky-alkoxysilane out of the apparatus through the same column and subsequently the rest of the cyanoalkyl-akoxysilane while bypassing the column, until a dry alkali metal chloride or alkaline earth metal chloride is obtained in the apparatus, and removing the dry chloride from the apparatus through a lock.

4,876,338

SYNTHESIS OF AZETIDINONES USING CUCL

Donald Hou, Verona; Yee-Shing Wong, Clifton; Dinesh Gala, East Brunswick, and Martin Steinman, Livingston, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 887,394, Jul. 21, 1986, Pat. No. 4,767,853. This application Jun. 7, 1988, Ser. No. 203,385

Int. Cl.[4] C07D *705/08*

U.S. Cl. 540—357 3 Claims

1. A process for producing 1-(allyloxycarbonyl)-methyl-3-(1-hydroxyethyl)-4-beta-naphthoxy-(thiocarbonyl)thio-2-azetidinone or stereoisomers thereof, comprising the steps:

(a) reacting 3,7-dioxo-6-(1-protected hydroxy ethyl)-2-(1-methylethylidene)-4-thia-1-azabicyclo[3.2.0]heptane with oxygen and cuprous chloride in the presence of methanol;

(b) reacting the compound produced in step (a) with ozone;

(c) reacting the compound produced in step (b) with ammonium hydroxide;

(d) reacting the compound produced in step (c) with allyliodoacetate;

(e) removing the hydroxy protecting group from the compound produced in step (d) with an acid;

(f) reacting the compound produced in step (e) with zinc and a mineral acid;

(g) reacting the compound produced in step (f) with O-2-naphthalenylcarbonochloridothioate;

(h) recovering the resulting 1-(allyloxycarbonyl)methyl-3-(1-hydroxyethyl)-4-beta-naphthoxy(thiocarbonyl)thio-2-azetidinone.

4,876,339

PROCESS FOR SYNTHESIS OF AZACYCLOALKANE-2,2-DIPHOSPONIC ACIDS

Helmut Blum, Duesseldorf, and Siglinde Hemmann, Meerbusch, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

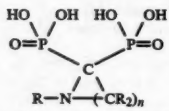
Filed Mar. 10, 1989, Ser. No. 322,328

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1989, 3808074

Int. Cl.[4] C07F *9/30*

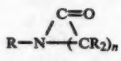
U.S. Cl. 540—450 20 Claims

1. A process for the preparation of azacycloalkane-2,2-diphosphonic acids of the general formula I:



(I)

where R means a hydrogen or a lower alkyl radical with from 1 to 3 carbon atoms, and n means an integer between 3 and 11, or of a water soluble salt of an acid of formula I, said process comprising reacting a lactam of the general formula II:



(II)

where R and n have the same meanings as for formula (I), with a phosphorus trihalide and phosphonic acid in the presence of water in an inert reaction medium that has the chemical structure of an adduct of ethanol with an average of from about 1 to about 20 moles of ethylene oxide or propylene oxide per mole of ethanol.

4,876,340

BENZAZECINE DERIVATIVES FOR COGNITIVE AND MEMORY FUNCTIONS

Werner Aschwanden, Ettingen; René Imhof, Gipf-Oberfrick, both of Switzerland; Roland Jakob, Inzlingen, Fed. Rep. of Germany, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

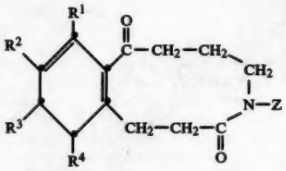
Division of Ser. No. 121,987, Nov. 18, 1987, Pat. No. 4,749,791, which is a division of Ser. No. 5,712, Jan. 21, 1987, Pat. No. 4,732,979. This application Feb. 11, 1988, Ser. No. 154,760

Claims priority, application Switzerland, Jan. 23, 1986, 266/86

Int. Cl.[4] C07D *227/08, 227/087*

U.S. Cl. 540—461 6 Claims

1. A compound of the formula



III

wherein R^1 and R^2 are independently hydrogen or chlorine, R^3 is hydrogen, fluorine, chlorine, bromine or methoxy, R^4 is hydrogen, chlorine or methoxy and Z is a readily cleavable alkanoyl, aroyl or aryl-alkanoyl residue derived from a carboxylic acid by removal of the hydroxy group but which is not acetyl, propionyl, benzoyl, chlorobenzoyl, methoxybenzoyl or phenylacetyl.

4,876,341

PROCESS FOR THE PREPARATION OF 6-METHYL-3,4-DIHYDRO-1,2,3-OXATHIAZIN-4-ONE 2,2-DIOXIDE

Joachim Schütz, Hofheim am Taunus, and Otto E. Schweikert, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 890,491, Jul. 25, 1986, abandoned. This application Aug. 2, 1988, Ser. No. 227,465

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1985, 3527070

Int. Cl.[4] C07D *291/06*

U.S. Cl. 544—2 20 Claims

1. A process for the preparation of 6-methyl-3,4-dihydro1,2,3-oxathiazin-4-one 2,2-dioxide which comprises ring closure of acetoacetamide-N-sulfonic acid or one of its salts - dissolved in an equimolar amount to 20-fold molar excess of SO_3 at a temperature of from −70° C. to +175° C. in a reactor within a reactor hold-up time not exceeding 10 minutes after which the ring closure product is passed on out of the reactor or, in the case where more than the equimolar amount of SO_3 is used, the SO_3 adduct of the ring closure product is passed on for hydrolysis, to yield the 6-methyl-3,4-dihydro-1,2,3-oxathiazin-4-one 2,2-dioxide.

4,876,342

OXAZINE COMPOUNDS SUBSTITUTED BY ONE OR MORE BASIC GROUPS AND PREPARATION THEREOF

Reinhard Pedrazzi, Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

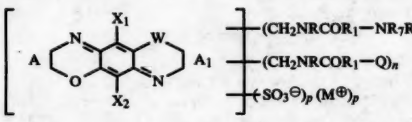
Continuation of Ser. No. 41,893, Apr. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 791,190, Oct. 25, 1985, abandoned. This application May 26, 1988, Ser. No. 199,211

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1984, 3449095; Jun. 7, 1985, 3520399

Int. Cl.[4] C07D *498/22;* C09B *19/00*

U.S. Cl. 544—14 21 Claims

1. A compound of formula I,



I

and acid addition salts thereof, in which

W is O or S,

each of X_1 and X_2 is independently hydrogen, halogen, cyano, C_{1-4}alkyl, C_{1-4}alkoxy, phenyl or phenylamino, which phenyl ring of the latter two groups is unsubstituted or substituted by one to three groups selected from halogen, C_{1-4}alkyl and C_{1-4}alkoxy; —NHCOR$_9$, —CONR$_{10}$R$_{11}$, —COOR$_{12}$ or —OCOR$_{13}$,

R$_9$ is C_{1-4}alkyl, phenyl or phenyl substituted by one or two groups selected from halogen, C_{1-4}alkyl and C_{1-4}alkoxy,

R$_{10}$ is hydrogen, C_{1-4}alkyl, cyclohexyl, phenyl-C_{1-4}-alkyl, unsubstituted phenyl or phenyl monosubstituted by chlorine, methyl or methoxy,

R$_{11}$ is hydrogen, C_{1-4}alkyl, cyclohexyl, phenyl or phenyl-C_{1-4}alkyl,

R$_{12}$ is hydrogen, C_{1-4}alkyl or cyclohexyl,

R$_{13}$ is C_{1-4}alkyl or cyclohexyl,

each of the rings A and A_1, independently, signifies a fused ring system containing one to four 4- to 8-membered carbocyclic and/or heterocyclic rings which may be further substituted,

each R is independently hydrogen or C_{1-4}alkyl,

each R_1 is independently C_{1-6}alkylene or C_{2-6}alkenylene,

each Q is independently halogen, —NR$_2$R$_3$ or ⊕—NR$_4$R$_5$R$_6$ An$^{\ominus}$,

An$^{\ominus}$ is a non-chromophoric anion,

M$^{\oplus}$ is hydrogen or a non-chromophoric cation,

each of m and n is independently a number of from 1 to 4, with the proviso that $2 \leqq m+n \leqq 6$,

p is a number of from 0 to 1,

R$_2$ is C_{1-12}alkyl, —Alk—Y in which —Alk— is a C_{2-6}alkylene group which may be interrupted by —O— or —NR— and which may be further substituted by OH or —NRR, and Y is OH or —NR$_2$'R$_3$'; unsubstituted C_{5-8}cycloalkyl or C_{5-8}cycloalkyl substituted by one to three C_{1-4}alkyl groups; phenyl or phenyl-C_{1-4}alkyl in which each phenyl ring is unsubstituted or substituted by one to three groups selected from halogen, C_{1-4}alkyl and C_{1-4}alkoxy,

R$_3$ is hydrogen, C_{1-12}alkyl, C_{2-4}alkyl monosubstituted by hydroxy, unsubstituted C_{5-8}cycloalkyl or C_{5-8}cycloalkyl substituted by one to three C_{1-4}alkyl groups,

R$_4$ has one of the significances of R$_2$,

R$_5$ has one of the significances of R$_3$ except hydrogen, and

R$_6$ is NH$_2$, C_{1-12}alkyl, C_{2-4}alkyl monosubstituted by hydroxy, or is phenyl-C_{1-4}alkyl, or

R$_2$ and R$_3$ or R$_4$ and R$_5$, together with the N-atom to which they are attached, form a 5- or 6-membered saturated or unsaturated ring which contains one to three hetero atoms and is further unsubstituted or substituted by one to three groups selected from C_{1-4}alkyl and C_{2-4}alkyl monosubstituted by hydroxy or amino, or

R$_4$, R$_5$ and R$_6$, together with the N-atom to which they are attached, form a pyridinium group which is unsubstituted or substituted by one or two C_{1-4}alkyl groups,

each of R$_7$ and R$_8$ is independently C_{1-12}alkyl, C_{2-4}alkyl monosubstituted by hydroxy, or C_{5-8}cycloalkyl which is unsubstituted or substituted by one to three C_{1-4}alkyl groups, or

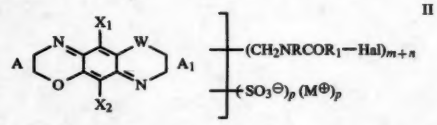
R$_7$ and R$_8$, together with the N-atom to which they are attached, form a 5- or 6-membered saturated or unsaturated ring which contains one to three hetero atoms and is further unsubstituted or substituted by one to three groups selected from C_{1-4}alkyl or C_{2-4}alkyl monosubstituted by hydroxy or amino,

R$_2$' is hydrogen or has one of the non-cyclic or cyclic significances of R$_2$ except —Alk—Y, and

R$_3$' has one of the non-cyclic or cyclic significances of R$_3$;

with the proviso that in a compound of formula I Q is different from —NR$_7$R$_8$.

17. A process for the preparation of a compound of formula I defined in claim 1, comprising reacting per mol of a compound of formula II,

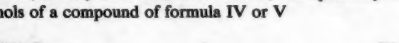


II

in which A, A_1, W, X_1, X_2, R, R_1, M, m, n and p are as defined in claim 1, and Hal is halogen, m mols of a compound of formula III,

III

in which R$_7$ and R$_8$ are as defined in claim 1, and optionally n or n_1 mols of a compound of formula IV or V



IV

V

in which R$_2$ to R$_6$ are as defined in claim 1, and n_1 is less than n, provided that when n mols of a compound of formula IV are employed, a compound of formula III and a compound of formula IV are different from each other,

whereby in a step (a) m=1 mol of a compound of formula III is reacted at a maximum temperature of 40° C. and in an alkaline pH range below 11;

and, if necessary, in a subsequent step (b) m-1 mols of a compound of formula III and optionally n or n_1 mols of a compound of formula IV or V are reacted in an alkaline pH range of approximately pH 11 and in a temperature range of from 45°–80° C.

4,876,343

PROCESS FOR STATINE AND STATINE ANALOGS

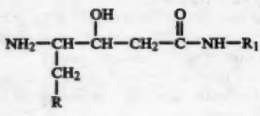
John C. Hodges, and Sylvester Klutchko, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jun. 15, 1988, Ser. No. 207,341

Int. Cl.[4] C07B *43/04*

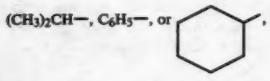
U.S. Cl. 544—168 15 Claims

1. A process for the preparation of a compound of formula I

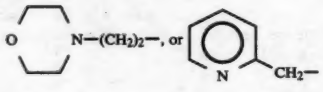


I

and pharmaceutically acceptable salts thereof, wherein R is

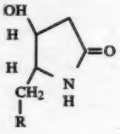


and R_1 is $CH_3CH_2CHCH_2-$, CH_3



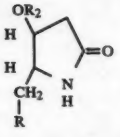
which comprises

(a) reacting a compound of formula V



V

wherein R is as defined above with a hydroxyl protecting reagent at about 0° C. to about 50° C. to afford a compound of formula IV

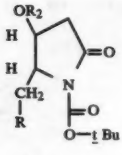


IV

wherein R_2 is $(CH_3)_3Si$, or

and R is as defined above;

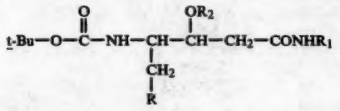
(b) treating the compound of formula IV with a tertiary butoxycarbonylating reagent to afford a compound of formula III



III

wherein t Bu is tertiary butyl and R and R_2 are as defined above;

(c) treating the compound of formula III with a compound of formula R_1NH_2 wherein R_1 is as defined above to afford a compound of formula II



II

wherein t Bu, R, R_1 and R_2 are as defined above; and

(d) finally treating a compound of formula II with an acid to afford a compound of formula I.

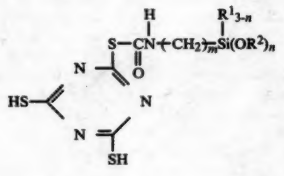
4,876,344

NOVEL ORGANOSILICON COMPOUNDS

Kunio Itoh; Motoo Fukushima, and Tsutomu Nakamura, all of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 29, 1988, Ser. No. 277,632
Claims priority, application Japan, Dec. 9, 1987, 62-311764
Int. Cl.[4] C07D *251/38*
U.S. Cl. 544—219 **7 Claims**

1. An organosilicon compound of the following formula, or a hydrolyzate thereof



wherein R^1 and R^2 independently represent a hydrogen atom or an alkyl group having from 1 to 8 carbon atoms, m is an integer of from 1 to 6 and n is an integer of from 1 to 3.

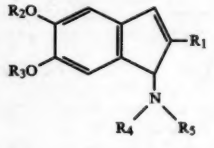
4,876,345

INDENE COMPOUNDS

Shozo Nakaoku; Kazuhiko Sakuma, both of Takayama; Yasuhiro Oshika, Sagamihara, and Kazuo Ohira, Takayama, all of Japan, assignors to Taiyo Pharmaceutical Industry Co., Ltd., Takayama, Japan

Division of Ser. No. 884,659, Jul. 11, 1986, Pat. No. 4,762,927. This application Jun. 6, 1988, Ser. No. 202,597
Claims priority, application Japan, Feb. 3, 1986, 61-21732
Int. Cl.[4] C07D *405/06*
U.S. Cl. 544—379 **16 Claims**

12. An indene compound of the formula (I):



(I)

wherein R_1 is a lower alkyl group, R_2 and R_3 are, individually, a lower alkyl group or, in combination, are an alkylenedioxy group, and R_4 and R_5, individually, are selected from the group consisting of 4-[2-(1,3-benzothiazolyl)]benzyl, 2-(4-isopropylthiophenyl)-2-hydroxyethyl, 2-[4-(2-furanylcarbonyl)-1-piperazinyl]ethyl, 2-piperidinoethyl and 2-[4-[2-(4-isopropyl-

thiophenyl)-2-hydroxyethyl]-1-piperazinyl]-ethyl groups, and salts thereof.

4,876,346

QUINOLINE COMPOUNDS

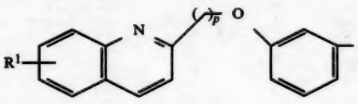
John H. Musser, Malvern; Anthony F. Kreft, III, Trooper, and Reinhold H. W. Bender, Valley Forge, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

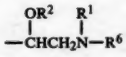
Continuation-in-part of Ser. No. 729,509, May 2, 1985, abandoned. This application May 15, 1986, Ser. No. 863,666

Int. Cl.[4] C07D *215/14, 215/16*

U.S. Cl. 546—172 **20 Claims**

1. A compound having the formula:



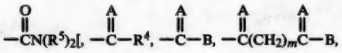


wherein

p is 0–3;

R^1 is hydrogen or lower alkyl;

R^2 is H or

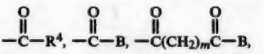


R^3 is H, lower alkyl or perfluoro lower alkyl;

R^4 is phenyl, pyridyl or thienyl;

R^5 is hydrogen, lower alkyl, phenyl or pyridyl;

R^6 is



$-SO_2R^3$, $-SO_2N(R^3)_2$, lower alkynyl or lower alkyl carbonyl prolinate;

B is OR^1 or $N(R^5)_2$;

m is 0–2;

and the pharmaceutically acceptable salts thereof.

4,876,347

METHINE DYES HAVING A PYRIDYL GROUP AND A PYRIDYL OR A QUINOLINYL GROUP

Ewald Daltrozzo, Konstanz, and Werner Sulger, Ueberlingen-Nussdorf, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

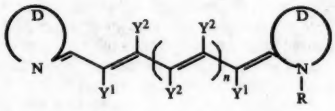
Division of Ser. No. 907,216, Sep. 15, 1986, Pat. No. 4,751,309. This application Mar. 24, 1988, Ser. No. 172,594

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533772

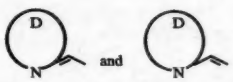
Int. Cl.[4] C07D *401/06*

U.S. Cl. 546—176 **16 Claims**

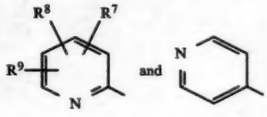
1. A methine dye having the formula



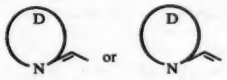
or the tautomeric forms thereof, where each Y^1 is the same or different and is selected from the group consisting of cyano, trifluoromethyl, nitro, carbo-C_1–C_{12}-alkoxy, phenylsulfonyl or phenylsulfonyl which is monosubstituted or disubstituted by C_1–C_{12}-alkyl, C_1–C_{12}-alkoxy, fluorine, bromine, chlorine and cyano, Y^2 is in each case, independently of the other, hydrogen, cyano, fluorine, bromine or chlorine, C_1–C_6-alkyl, C_5–C_7-cycloalkyl, phenyl, or pyridyl, R is hydrogen, C_1–C_{20}-alkyl, C_7–C_{10}-aralkyl or β-hydroxyethyl, and n is 1, 2, 3, 4, 5 or 6, and the groups



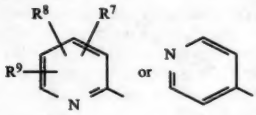
are identical or different and are selected from the group consisting of



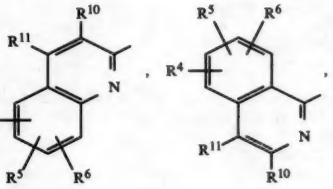
or one

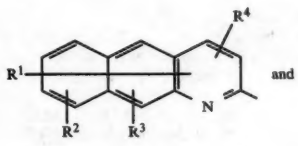


is

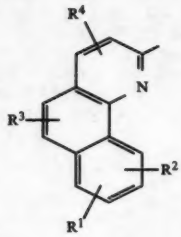


and the other radical D is selected from the group consisting of





-continued



wherein R^1–R^9, R^{10} and R^{11} independently of one another are each hydrogen, fluorine, bromine, chlorine, CN, CF_3, nitro, C_1–C_4-alkyl, C_1–C_4-alkoxy, or phenyl which is unsubstituted or is substituted by fluorine, bromine, chlorine, C_1–C_4-alkyl, C_1–C_4-alkoxy, CN, CF_3 or NO_2, only one nitro group being present per radical D.

4,876,348

PROCESS FOR MAKING 3-CYANOPYRIDINE

Robert DiCosimo, Shaker Heights; James D. Burrington, Richmond Heights, and Dev D. Suresh, Macedonia, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 29, 1985, Ser. No. 792,421

Int. Cl.[4] C07D *213/57, 213/133*

U.S. Cl. 546—252 **6 Claims**

1. A process for making 3-cyanopyridine which comprises the following steps:

(1) reacting 2-methylglutaronitrile in a known reaction by heating said nitrile in the vapor phase in admixture with 5–50 moles of hydrogen gas while in contact with a Pt or Pd catalyst to produce a mixture containing 3-methylpyridine and lesser amounts of 3-methylpiperidine wherein the molar ratio of the former to the latter is at least 3:1,

(2) separating the normally liquid effluent from step (1) from the gaseous components of the effluent,

(3) reacting in a reaction zone normally liquid effluent from step 1 containing 3-methylpyridine and 3-methylpiperidine, together with NH_3 and molecular oxygen, while in vapor phase contact with a solid catalyst which is a complex oxide having the elements and the amounts thereof indicated by the empirical formula

$$P_aV_bMo_cM_dO_x$$

wherein

M is one or any number more of Sb, Fe, W, Cu, K, Cs, B, Te, Sn, Mn, Nb, U, Bi and Cr and

a=0.1–3,

b=0.1–6,

a+b=at least 1.5,

c=12,

d=0–4, and

x is a number sufficient to satisfy the valence requirements of other elements present, under the reaction conditions suitable for ammoxidizing 3-methylpyridine over such catalyst, wherein the feed initially contacting the catalyst in said reaction zone contains a molar ratio of 3-methylpyridine to 3-methylpiperidine of at least 3:1, thereby producing said 3-cyanopyridine.

4,876,349

TETRAHYDRONAPHTHALENE AND INDANE DERIVATIVES

Michael Klaus, Weil am Rhein, and Ekkehard Weiss, Inzlingen, both of Fed. Rep. of Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

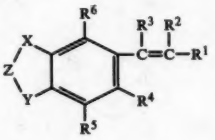
Filed Jul. 10, 1987, Ser. No. 72,075

Claims priority, application Switzerland, Jul. 15, 1986, 2826/86

Int. Cl.[4] C07D *213/00*

U.S. Cl. 546—350 **11 Claims**

1. A compound of the formula



I

wherein X and Y are independently —CH_2— or >$C(CH_3)_2$; Z is —CHR^8— or —CHR^8—CHR^8—; R^1 is pyridyl, unsubstituted; R^2 and R^3 are independently hydrogen, lower-alkyl, trifluoromethyl or halogen and one of R^2 and R^3 is always trifluoromethyl or lower-alkyl; R^4 and R^5 are independently hydrogen, alkyl, alkoxy or halogen; R^6 is hydrogen, lower-alkyl or a residue —OR^7; R^7 is hydrogen, lower-alkyl or acyl; R^8 is hydrogen or lower-alkyl; and R^7 and R^8 can be the same or different from one another.

4,876,350

PROCESS FOR THE PRODUCTION OF (+) BIOTIN

John McGarrity, and Leander Tenud, both of Visp, Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

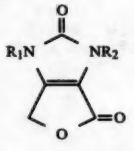
Filed Dec. 16, 1987, Ser. No. 134,210

Claims priority, application Switzerland, Oct. 18, 1986, 5051/86

Int. Cl.[4] C07D *231/00*

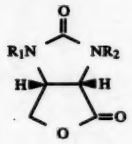
U.S. Cl. 548—110 **17 Claims**

1. Process for the production of (+) biotin, comprising catalytically hydrogenating a compound of the formula:



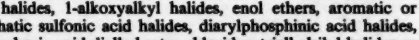
I

wherein R_1 is an (R)- or (S)-1-phenylalkyl group, an (R)- or (S)-1-alkoxycarbonyl-1-phenylmethyl group or an (R)- or (S)-1-aryloxycarbonyl-1-phenylmethyl group, and R_2 is hydrogen, a substituted or unsubstituted alkanoyl group, an unsubstituted or a substituted benzoyl group, a substituted or an unsubstituted benzyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an aryloxyalkyl group, an alkoxyalkyl group, a pyranyl group, an unsubstituted or substituted benzenesulfonyl group, an alkylsulfonyl group, a diarylphosphinyl group, a dialkoxyphosphinyl group or a trialkylsilyl group, with hydrogen, separating the desired diastereomer of the formula:



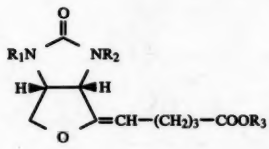
II

if R_2 is H, introducing a protective group by reaction with aliphatic or aromatic acid chlorides, aliphatic or aromatic carboxylic acid anhydrides, haloformic acid alkyl esters, benzyl halides, 1-alkoxyalkyl halides, enol ethers, aromatic or aliphatic sulfonic acid halides, diarylphosphinic acid halides, phosphoric acid dialkyl ester chlorides, trialkylsilyl halides or trialkylsilyl acetamides, converting the diastereomer by a further reaction with a thiocarboxylic acid salt derivative into the corresponding thiolactone, reacting the corresponding thiolactone with a Grignard reagent and subsequently splitting off of water or with a compound of the formula:



III

wherein R_3 is H or alkyl with 1 to 4 C atoms and X is a halogen atom, in the presence of a base to a compound of the formula:



IV

where R_3 has the above-mentioned meaning, catalytically hydrogenating said compound and then converting said catalytically-hydrogenated compound into (+) biotin by cleavage of the protective groups.

4,876,351

PROCESS FOR THE SEPARATION OF A MIXTURE OF "SYN" AND "ANTI" OXIME ISOMERS

Colin Robinson, Allinthwaite; David T. Eastlick, Grange-over-Sands, and Audrey J. Bownass, Haverthwaite, all of England, assignors to Glaxo Group Limited, London, England

Division of Ser. No. 648,382, Sep. 7, 1984, Pat. No. 4,717,768. This application Oct. 30, 1987, Ser. No. 114,841

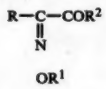
Claims priority, application United Kingdom, Sep. 9, 1983, 8324152

The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.

Int. Cl.[4] C07D *277/30, 285/12*

U.S. Cl. 548—204 **11 Claims**

1. A method for separating a mixture of syn and anti oxime isomers, one from the other, of a compound formula



or salt or solvate thereof which comprises absorbing said mixed oxime isomers onto a non-functional macroreticular absorption resin, and eluting said resin to yield at least one eluate fraction containing one of said isomers substantially free of the other of said isomers; wherein R is selected from the group consisting of carbocyclic groups, heterocyclic groups and C_1–C_6 alkyl groups; said carbocyclic groups having 5–12 carbon atoms; said heterocyclic groups possessing 5 or 6 ring members and containing from 1 to 4 heteroatoms selected from the group consisting of sulphur, nitrogen and oxygen; R^1 represents a C_{5-10} aryl or C_{5-10} aralkyl group or an aliphatic group selected from C_{1-6} alkyl, C_{3-7} cycloalkyl, C_{4-10} cycloalkylalkyl, C_{2-6} alkenyl and C_{4-7} cycloalkenyl, wherein each of the above R^1 groups may be optionally substituted by a free or blocked carboxy, carbamoyl, cyano or protected or unprotected amino group; and R^2 represents a hydroxy group or a blocked hydroxy group.

4,876,352

PRESSURIZED FLUORINATION OF HYDROXY ALKYL GROUPS

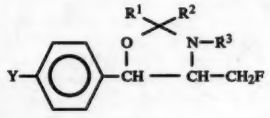
Doris P. Schumacher, Floraham Park; Jon E. Clark, Highland Park, and Bruce L. Murphy, Glen Ridge, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Sep. 14, 1988, Ser. No. 244,210

Int. Cl.[4] C07D *263/10*

U.S. Cl. 548—232 **13 Claims**

1. A process for preparing compounds of the formula



wherein

Y is hydrogen, nitro, methylthio, methylsulfoxy, or methylsulfonyl;

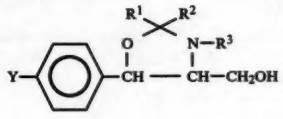
R^1 is alkyl, haloalkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, aralkyl, aralkenyl, aryl, aromatic heterocyclic;

R^2 is hydrogen, alkyl, haloalkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, aralkyl, aralkenyl, aryl, aromatic heterocyclic;

R^1 together with R^2 is an oxygen atom;

R^3 is hydrogen; and

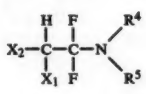
R^2 together with R^3 is a covalent bond, with an α, α-difluoroalkylamine fluorinating agent of the formula III which comprises treating under pressure a compound of the formula



II

wherein

Y and R are defined hereinabove, with an α, α-difluoroalkylamine fluorinating agent of the formula III



III

wherein

X_1 is chlorine or fluorine,

X_2 is chlorine, fluorine or trifluoromethyl

R^4 and R^5 taken individually are loweralkyl, and

R^4 and R^5 taken together with the attached nitrogen atom represent the residue of a heterocyclic radical contain five to seven ring atoms.

4,876,353

PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE 2-HYDROXYETHYL-AZOLE DERIVATIVES

Udo Kraatz, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

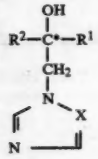
Filed Jan. 25, 1988, Ser. No. 147,415

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1987, 3703082

Int. Cl.[4] **C07D** *249/12, 233/60*

U.S. Cl. 548—262 **9 Claims**

1. A process for the preparation of an optically active 2-hydroxyethyl-azole derivative of the formula



(I)

in which

R^1 represents alkyl having 1 to 6 carbon atoms, cycloalkyl having 3 to 8 carbon atoms which is optionally monosubstituted, disubstituted or trisubstituted by alkyl having 1 to 4 carbon atoms and/or halogen, the substitutents being identical or different, cycloalkylalkyl which has 3 to 8 carbon atoms in the cycloalkyl part and 1 to 4 carbon atoms in the alkyl part and which is optionally monosubstituted, disubstituted or trisubstituted by alkyl having 1 to 4 carbon atoms and/or halogen, the substituents being identical or different, or phenyl which is optionally monosubstituted, disubstituted or trisubstituted by alkyl having 1 to 6 carbon atoms, halogen, halogenoalkyl having 1 to 2 carbon atoms and 1 to 5 halogen atoms, nitro and/or hydroxyl the substituents being identical or different,

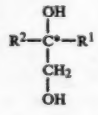
R^2 represents straight-chain or branched alkyl having 1 to 8 carbon atoms, alkynyl having 3 to 8 carbon atoms, cycloalkyl having 3 to 8 carbon atoms, cycloalkylalkyl having 3 to 8 carbon atoms in the cycloalkyl part and 1 to 4 carbon atoms in the alkyl part, benzyl which is optionally monosubstituted, disubstituted or trisubstituted in the phenyl part by alkyl having 1 to 4 carbon atoms and/or halogen, the substituents being identical or different, or the radicals of the formulae $-CH_2'CH_2-R^3$,$C-H_2-O-R^3$, $-C\equiv C-R^3$ or $-CH_2-CH=CH-R^4$, where

R^3 represents phenyl which is optionally monosubstituted, disubstituted or trisubstituted by alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, halogen and/or phenyl, the substituents being identical or different, and

R^4 represents hydrogen or phenyl which is optionally monosubstituted, disubstituted or trisubstituted by alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, halogen and/or phenyl, the substituents being identical or different, and

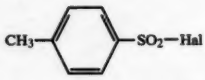
X represents a nitrogen atom or a CH group, comprising

(a) in a first stage, reacting an optically active diol of the formula



(II)

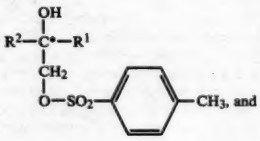
with a tosyl halide of the formula



(III)

in which

Hal represents chlorine or bromine, in the presence of an acid-binding agent, thereby to produce a tosylate of the formula



(IV)

(b) in a second stage reacting the tosylate with an azole of the formula

(V)

in the presence of an acid-binding agent.

4,876,354

ARYLMETHYLAZOLES AND THEIR SALTS, PROCESSES FOR THEIR PREPARATION, AGENTS WHICH CONTAIN THESE COMPOUNDS, AND THEIR USE

Herbert Siegel, Hofheim am Taunus; Klaus-Dieter Kampe, Bad Soden am Taunus; Hans G. Alpermann, Konigstein; Hermann J. Gerhards, Hofheim am Taunus; Patricia Usinger, Eppstein; Ulrich Schacht, Hofheim am Taunus; Margret Leven, Kelkheim; Wolfgang Raether, Dreieich; Walter Dittmar, Hofheim am Taunus, and Burkhard Sachse, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

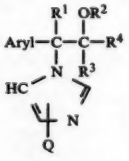
Continuation of Ser. No. 23,710, Mar. 9, 1987, abandoned, Continuation-in-part of Ser. No. 909,598, Sep. 22, 1986. This application May 3, 1988, Ser. No. 191,756

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1985, 3533824; Nov. 23, 1985, 3541429; Aug. 14, 1986, 3627656; Aug. 22, 1986, 3628545

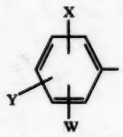
Int. Cl.[4] **C07D** *233/64, 295/04, 251/20*

U.S. Cl. 548—341 **8 Claims**

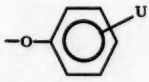
1. A compound of the formula I



in which aryl denotes a radical



or a 1- or 2-naphthyl radical which is unsubstituted or substituted by U and/or a substituent V, where X denotes H, (C_1–C_4)-alkyl, phenyl, fluorine, chlorine, bromine, hydroxyl, (C_1–C_4)-alkoxy,



(C_1–C_4)-alkylthio, —NR_2^5, in which the radicals R^5 - identical or different - denote (C_1–C_4)-alkyl or together with the nitrogen atom denote a pyrrolidine, piperidine or morpholine radical, or X denotes CF_3 or a benzyloxy group which is unsubstituted or carries one or two substituents in the phenyl radical, the substituents being identical or different and denote fluorine, chlorine, OCH_3, OC_2H_5 or (C_1–C_3)-alkyl,

Y denotes H, (C_1–C_4)-alkyl, fluorine, chlorine, bromine, (C_1–C_4)-alkoxy or (C_1–C_4)-alkylthio, or

X and Y together in the 2,3- or 3,4-position denote a —$(CH_2)_L$—chain, in which L=3 or 4,—OCH_2CH_2—or —O—CH_2—O,

W denotes H, CH_3 or OCH_3,

V denotes (C_1–C_4)-alkyl, phenyl, fluorine, chlorine, bromine, hydroxyl, (C_1–C_4)-alkoxy, (C_1–C_4)-alkylthio, —NR_2^5, in which R^5 denotes (C_1–C_4)-alkyl or together with the nitrogen atom denotes a pyrrolidine, piperidine or morpholine radical, benzyloxy or CF_3, and

U denotes CH_3, F, Cl or OCH_3,

R^1 and Q denote H or (C_1–C_4)-alkyl,

R^2 denotes H, (C_1–C_4)-alkyl, (C_3–C_5)-alkenyl or (C_3–C_5)-alkynyl,

R^3 and R^4 together denote a —$(CH_2)_n$—chain which is unsubstituted or substituted by (C_1–C_4)-alkyl, OCH_3 or phenyl, in which n=2–11; a corresponding hydrocarbon chain containing a double bond, or a —$(CH_2)_m$—chain which is unsubstituted or substituted by (C_1–C_4)-alkyl, OCH_3, CH_2OCH_3 or phenyl and is bridged singly or multiply, in which m=4 or 5 and in which the bridge or bridges contain a total of 1 to 5 bridge carbon atoms, and the bridge carbon atoms in turn may be bridged and in which the bridge or bridges contain no C—C double bonds or not more than one C—C double bond,

and its physiologically tolerated acid addition salts and its stereoisomers and optically active enantiomers.

6. A pharmaceutical composition having an antimycotic action which contains a pharmaceutically effective amount of a compound of the formula I as claimed in claim 1 together with a pharmaceutically suitable carrier.

8. A pharmaceutical composition having an antidepressant action, which contains an effective amount of a compound I as claimed in claim 1 together with a pharmaceutically suitable carrier.

4,876,355

POWDERED IMIDAZOLINE PRODUCT AND METHOD FOR PRODUCING SAME

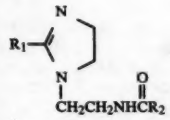
Leonard Hughes; James G. Fuller, both of Dublin, and Gary W. Earl, Bexley, all of Ohio, assignors to Sherex Chemical Company, Inc., Dublin, Ohio

Filed Oct. 21, 1988, Ser. No. 278,200

Int. Cl.[4] C07D *233/18*

U.S. Cl. 548—352 **10 Claims**

6. A method for making a stable, free-flow particulate imidazoline product of the structure:



where R_1 and R_2 independently are a saturated C_{12}–C_{22} alkyl group, which comprises condensing and cyclyzing a fatty acid or ester and a polyamine; and

rapidly cooling the molten, cyclyzed, solvent-free product to a particulate form.

4,876,356

NAPHTHOLACTAM DYES AND OPTICAL RECORDING MEDIUM CONTAINING THESE DAYS

Matthias Dust, Mannheim; Peter Neumann, Wiesloch; Ernst Schefczik, Ludwigshafen; Heidi Benthack-Thoms, Limburgerhof; Helmut Barzynski, Bad Durkheim; Klaus-Dieter Schomann, Ludwigshafen; Harald Kuppelmaier, Heidelberg, and Eberhard Koester, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

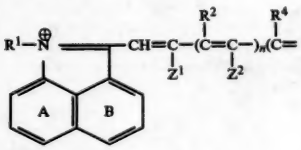
Filed Mar. 12, 1987, Ser. No. 24,988

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608214

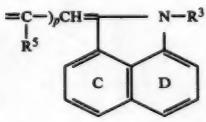
Int. Cl.[4] C07D *209/90, 409/04*

U.S. Cl. 548—419 **3 Claims**

1. A naphtholactam dye of the formula Ia



(Ia)



where

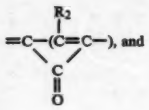
R^1 and R^3 are identical or different and independently of one another are each C_4–C_{20}-alkyl which may be interrupted by ether oxygen or each are benzyl, 2-phenylethyl or C_5 or C_6-cycloalkyl

R^2, R^4 and R^5 are identical or different and independently of one another are each hydrogen, C_1–C_4-alkyl, C_5–C_6-cycloalkyl, phenyl, alkoxycarbonyl in which alkoxy is C_1–C_4,-carboxyalkyl in which alkyl is methyl or ethyl, hydroxyl, chlorine or bromine,

n is 0 or 1,

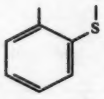
p, independently of n, is 0, 1 or 2,

Z^1 and Z^2 are each hydrogen or, where n is 1, may together form an unsubstituted or C_1–C_4-alkyl-substituted C_2- or C_3-alkylene chain or together with the moiety to which they are attached from the radical



$X^{\ominus}$ is an anion, and

the rings A, B, C and D are unsubstituted or substituted by methyl, ethyl, phenyl, C_1–C_4-alkoxy, C_1–C_6-alkylthio, cyano, dialkylamino in which each alkyl is methyl or ethyl, chlorine, bromine, hydroxysulfonyl, phenylthio or the radical,



with the proviso that if

(a) at least one of the rings A, B, C or D are unsubstituted or substituted by chlorine, bromine, C_1–C_4-alkoxy, dialkylamino in which each alkyl is methyl or ethyl, n and p are not simultaneously 0,

(b) at least one of the rings A, B, C or D are unsubstituted or substituted by chlorine, bromine, C_1–C_4-alkoxy, dialkylamino in which each alkyl is methyl or ethyl, n is 1, p is 0 and Z^1 and Z^2 are each hydrogen, R^2 is not hydrogen,

(c) at least one of the rings A, B, C or D are unsubstituted or substituted by chlorine, bromine, C_1–C_4-alkoxy, dialkylamino in which each alkyl is methyl or ethyl, n is 0 and p is 1 or 2, R^4 and R^5 are not simultaneously hydrogen, and

(d) at least one of the rings A, B, C or D are unsubstituted or substituted by chlorine, bromine, C_1–C_4-alkoxy, dialkylamino in which each alkyl is methyl or ethyl, n and p are each 1 and Z^1 and Z^2 are each hydrogen, one or more of the radicals R^2, R^4 and R^5 is not hydrogen.

4,876,357

CHROMOGENIC PHTHALIDES AND AZAPHTHALIDES

Rox Phaff, Rheinfelden, and Davor Bedekovic, Biel-Benken, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

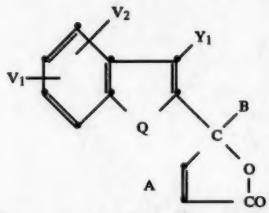
Filed Oct. 26, 1987, Ser. No. 113,840

Claims priority, application Switzerland, Oct. 28, 1986, 4268/86; Jun. 5, 1987, 2148/87

Int. Cl.[4] C07D *405/02*

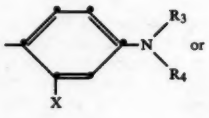
U.S. Cl. 548—463 9 Claims

1. A chromogenic phthalide or azaphthalide of the formula

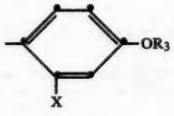


(I)

in which V_1 and V_2 are each, independently of the other, hydrogen, halogen, lower alkyl, lower alkoxy, (lower alkoxy)-carbonyl or $—NR_1R_2$, at least one of the radicals V_1 and V_2 being lower alkoxy or $—NR_1R_2$, A is an unsubstituted or halogen-, cyano-, nitro-, (lower alkyl)-, (lower alkoxy)-, (lower alkyl)thio-, (lower alkyl)amino-or di(lower alkyl)amino-substituted benzene, naphthalene, pyridine, quinoline, pyrazine or quinoxaline ring, B is a substituted phenyl radical of the formula



(Ia)



(Ib)

Q is

R_1, R_2, R_3 and R_4 are each, independently of the others, hydrogen, unsubstituted or halogen-, hydroxy-, cyano- or (lower alkoxy)-substituted alkyl having at most 12 carbon atoms, cycloalkyl having 5 to 10 carbon atoms or unsubstituted or halogen-, cyano-, (lower alkyl)- or (lower alkoxy)ringsubstituted phenalkyl or phenyl, or the substituent pairs (R_1 and R_2) and (R_3 and R_4) are each, independently of each other, together with the nitrogen atom joining them a five- or six-membered, heterocyclic radical, Y_1 is hydrogen, lower alkyl, cycloalkyl, phenalkyl or phenyl, Z_2 is hydrogen, unsubstituted or halogen-, hydroxyl-, cyano- or (lower alkoxy)-substituted alkyl having at most 12 carbon atoms, acyl having 1 to 12 carbon atoms or unsubstituted or halogen-, cyano-, (lower alkyl)- or (lower alkoxy)-substituted benzyl, X is hydrogen, halogen, lower alkyl, C_1–C_{12}-alkoxy, C_1–C_{12}-acyloxy, benzyl, phenyl, benzyloxy, phenyloxy, halogen-, cyano-, (lower alkyl)- or (lower alkoxy)-substituted benzyl or benzyloxy, or the group $—NT_1T_2$, T_1 and T_2 are each, independently of the other, hydrogen, lower alkyl, cycloalkyl, unsubstituted or halogen-, cyano-, (lower alkyl)or (lower alkoxy)-substituted benzyl or acyl having 1 to 12 carbon atoms and T_1 is also unsubstituted or halogen-, cyano-, (lower alkyl)- or (lower alkoxy)-substituted phenyl.

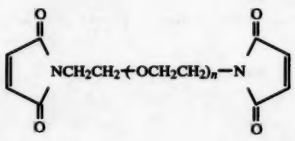
4,876,358

OXYETHYLENE BISMALEIMIDE DERIVATIVES

David C. Alexander, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Nov. 25, 1987, Ser. No. 125,086
Int. Cl.[4] C07D *207/452*
U.S. Cl. 548—521 1 Claim

1. A liquid bismaleimidoaspartimide prepolymer comprising 60 to 90 weight percent bismaleimide of the formula:



wherein n=2 and 10 to 40 weight percent triethylene glycol diamine.

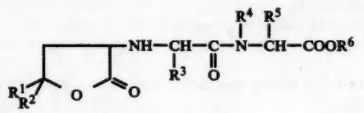
4,876,359

NOVEL GAMMA-BUTYROLACTONE DERIVATIVES

Hiroshi Hasegawa; Noriaki Shioiri, both of Narita; Tadashi Narita, Chiba, and Tatsuhiko Katori, Tone, all of Japan, assignors to SS Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Oct. 1, 1987, Ser. No. 103,415
Claims priority, application Japan, Oct. 7, 1986, 61-238592; Mar. 31, 1987, 62-78899
Int. Cl.[4] C07D *207/00*
U.S. Cl. 548—533 3 Claims

1. A γ-butyrolactone derivative represented by formula (I)



(I)

wherein R^1 and R^2 may be the same or different and each individually is a hydrogen atom or a straight-chain or branched chain alkyl group, or R^1 and R^2 are bonded together thereby forming an alkylene group of 2–6 carbon atoms, R^3 is hydrogen or a lower alkyl, aralkyl, amino lower alkyl or lower alkoxycarbonylamino lower alkyl group, R^4 is a lower alkyl, cycloalkyl or aralkyl group, R^5 is hydrogen or a lower alkyl group, or R^4 and R^5 are bonded together to form an alkylene group having from 2–4 carbon atoms, and R^6 is hydrogen or a lower alkyl or aralkyl group; or a pharmacologically acceptable salt thereof.

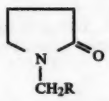
4,876,360

1-THIOCARBAMYLMETHYLPYRROLIDINE-2-THIONE, PROCESS FOR PREPARING

Vladimir G. Granik, Konakovsky proezd, 19, kv. 64., Moscow; Tatyana V. Stezhko, ulitsa Severnaya, 8, kv. 30. oblast, Odintsovo, Moskovskaya; Robert G. Glushkov, ulitsa Gorkogo, 43, kv. 90., Moscow; Mikhail D. Mashkovsky, Leningradsky prospekt, 75a, kv. 55., Moscow; Lidia F. Roschina, Rostovskaya naberezhnaya, 3, kv. 135., Moscow; Antonina I. Polezhaeva, ulitsa 13 Parkovaya, 25, korpus 1, kv. 6., Moscow; Roza B. Parimbetova, ulitsa 1. Babushkina, 3, kv. 217., Moscow; Jury G. Bobkov, ulitsa Latsisa, 33, korpus 1, kv. 7., Moscow; Alexandr S. Losev, ulitsa Bekhtereva, 7, korpus 1, kv. 42., Moscow, and Irina A. Ivanova, Volokolamskoe shosse, 14, kv. 41., Moscow, all of U.S.S.R.

Division of Ser. No. 198,999, Apr. 4, 1988, Pat. No. 4,839,380. This application Apr. 5, 1989, Ser. No. 333,349
Claims priority, application U.S.S.R., Mar. 23, 1984, 3714493
Int. Cl.[4] C07D *207/24*
U.S. Cl. 548—550 3 Claims

1. A process for producing 1-thiocarbamylmethylpyrrolidine-2-thione, which comprises reacting a derivative of pyrrolidone-2 of the general formula:



wherein R is nitrile or carbamyl with phosphorus pentasulphide in an inert non-polar solvent at a temperature above room temperature, followed by treatment of the resulting precipitate with water upon boiling and isolation of the desired product.

4,876,361

PROCESS FOR THE PRODUCTION OF THIOPHENES FROM ALPHA-METHYLENE KETONES IN THE SINGLE-STAGE PROCESS AND NEW ORTHO-FUSED THIOPHENES PRODUCED BY MEANS OF THE PROCESS

Claus-D. Czogalla, Feldkirchen-Westerham, Fed. Rep. of Germany, assignor to Rita von der Haar-Czogalla, Feldkirchen-Westerham, Fed. Rep. of Germany

Filed Dec. 7, 1987, Ser. No. 129,701
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3643983
Int. Cl.[4] C07D *333/50*
U.S. Cl. 549—41 22 Claims

1. A process for the production of a thiophene or b.d-ortho-fused thiophene, comprising:
reacting an α-methylene ketone in a polar solvent with bromine to form a 2-bromo-1-ketone,
separating the solvent out,
directly reacting the formed 2-bromo-1-ketone with a sulphurising agent in a solvent to form a reaction product, and
isolating the formed reaction product.

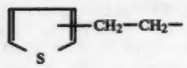
4,876,362

PROCESS FOR THE PREPARATION OF THIENYLETHYLAMINES

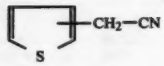
Joël Radisson, Toulouse, and Emile Braye, Auterive, both of France, assignors to Sanofi, Paris, France

Filed Dec. 11, 1987, Ser. No. 132,070
Claims priority, application France, Dec. 23, 1986, 8618101
Int. Cl.[4] C07D *409/00, 333/12*
U.S. Cl. 549—59 7 Claims

1. A process for the preparation of thienylethylamines of the formula R-NH-R', in which R represents



and R' represents H or the radical R, comprising subjecting a solution of a thienyl-acetonitrile of the formula



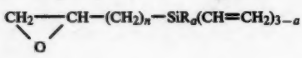
to a hydrogenation in the presence of a Raney nickel catalyst and a mineral or organic base, at a pressure between 10^5 and 10^7 Pa, and at a temperature between 15° C. and 80° C.

4,876,363
EPOXY-CONTAINING ORGANIC SILICON COMPOUNDS

Yuichi Funahashi; Junichiro Watanabe; Kiyoshi Takeda, and Makaoto Matsumoto, all of Ohta, Japan, assignors to Toshiba Silicone Co., Ltd., Japan

Filed Aug. 30, 1988, Ser. No. 238,720
Claims priority, application Japan, Sep. 11, 1987, 62-226404
Int. Cl.[4] C07D *303/04*
U.S. Cl. 549—215 **4 Claims**

1. An epoxy-containing organic silicon compound represented by general formula (I):



(I)

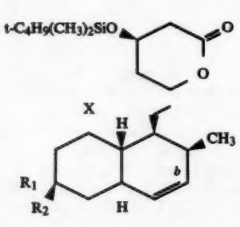
wherein R, which may be the same or different, represents a monovalent hydrocarbon group free from an aliphatic unsaturated bond which is selected from the group consisting of an alkyl group, a cycloalkyl group, an aryl group and an aralkyl group having up to 9 carbon atoms; a represents 1 or 2; and n repreents an integer of 2 to 6.

4,876,364
HYDROGENATION PROCESS FOR THE FORMATION OF 4A,5-DIHYDRO HMG-COA REDUCTASE INHIBITORS

Ann D. Schuda, New Providence; Thomas R. Verhoeven, Cranford, and Ichiro Shinkai, Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 3, 1987, Ser. No. 92,802
The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.
Int. Cl.[4] C07D *309/30*
U.S. Cl. 549—214 **18 Claims**

1. A process for the preparation of a compound of structural formula (III):



III

wherein:

X is OH, NH_2 or OR; where R is C_{1-5}alkyl, C_{3-7}cycloalkyl, phenylC_{1-3}alkyl, or substituted phenylC_{1-3}alkyl in which the substituent is halogen, CN, or CF_3;

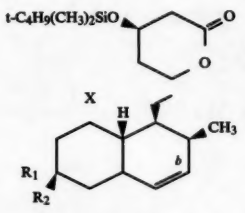
R_1 is H or CH_3 or $CH_2OSi(Me)_2t—C_4H_9$ or $OSi(Me)_2$-t—C_4H_9;

R_2 is H or $CH_2OSi(Me)_2t—C_4H_9$ or $OSi(Me)_2t—C_4H_9$; provided that when R_1 or R_2 is $CH_2OSi(Me)_2t—C_4H_9$ the other is H; and one and only one of R_1 and R_2 can be $OSi(Me)_2t—C_4H_9$; and

b is a double bond or a single bond;

which comprises:

contacting a compound of structural formula (II)



II

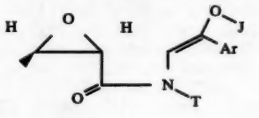
with 1,5-cyclooctadiene(pyridine)(tricyclohexyl-phosphine)iridium(I)hexafluorophosphate or norbornadiene-1,4-bis(diphenylphosphino)butane rhodium(I)hexafluoroborate; in an alcoholic solvent, under hydrogen gas pressure.

4,876,365
INTERMEDIATE COMPOUNDS FOR PREPARING PENEMS AND CARBAPENEMS

Michael P. Kirkup, Somerset, and Stuart W. McCombie, Caldwell, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Dec. 5, 1988, Ser. No. 279,751
Int. Cl.[4] C07D *303/02*
U.S. Cl. 549—215 **9 Claims**

1. A compound represented by the formula



(III)

wherein

J is $—SiR^1R^2R^3$;

R^1, R^2 and R^3 independently represent lower alkyl or phenyl;

T is hydrogen, or a blocking group T', which is $—CH_2OR^4$ (wherein R^4 is alkyl or phenyl), 2-alkenyl, phenyl, phenylalkyl, or phenyl substituted with alkyl, alkoxy or halogen; and

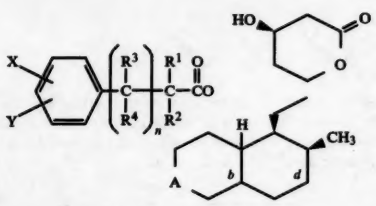
Ar is phenyl or phenyl substituted with nitro, alkyl, alkoxy, or halo.

4,876,366
ANTIHYPERCHOLESTEROLEMIC COMPOUNDS

William F. Hoffman; Ta J. Lee; Robert L. Smith, all of Lansdale, and Clarence S. Rooney, Worcester, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

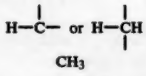
Continuation-in-part of Ser. No. 859,534, May 5, 1986, abandoned. This application Jun. 10, 1988, Ser. No. 205,407
Int. Cl.[4] A61K *31/365*; C07D *309/30*
U.S. Cl. 514—570 **22 Claims**

1. A compound represented by the following general structural formula (I'):



(I')

wherein:
n is 0 to 2;
R^1 is C_{1-3}alkyl;
R_2 is hydrogen or C_{1-3}alkyl;
each of the R^3s and R^4s are independently selected from hydrogen or C_{1-3}alkyl;
X and Y independently are hydrogen, trifluoromethyl, hydroxy, C_{1-3} alkyl thiomethyl, hydroxy methyl, or aminomethyl, provided that both X and Y are not hydrogen;
A is



and
b and d represent single bonds, or both b and d represent double bonds.

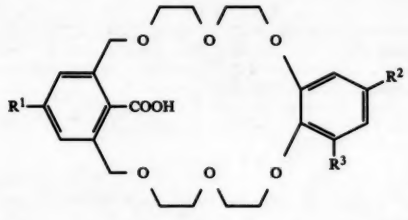
4,876,367

MACROCYCLIC POLYETHER CARBOXYLIC ACIDS

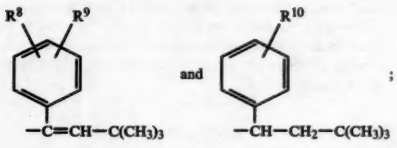
Frank J. Urban, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 916,676, Sep. 4, 1986, Pat. No. 4,777,270. This application Sep. 6, 1988, Ser. No. 241,169
Int. Cl.[4] C07D *323/00*
U.S. Cl. 549—349 **10 Claims**

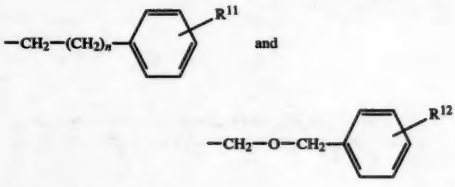
1. A macrocyclic polyether compound of formula



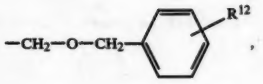
and the pharmaceutically-acceptable base salts thereof, wherein:
R^1 is selected from the group consisting of hydrogen and t-butyl;
R^2 is selected from the group consisting of hydrogen, alkyl having 1 to 14 carbons, cycloalkyl having 5 to 8 carbons, phenyl, alkylphenyl having 1 to 4 carbons in said alkyl, 1-adamantyl, $—C(R^7)=CH—C(CH_3)_3$,



wherein R^7 is hydrogen or alkyl having 1 to 8 carbons; R^8 and R^9 when taken separately are each hydrogen, alkyl having 1 to 3 carbons, alkoxy having 1 to 3 carbons or alkylthio having 1 to 3 carbons; R^8 and R^9 when taken together with the carbons to which they are attached form a fused benzo ring; and R^{10} is hydrogen, alkyl having 1 to 3 carbons, alkoxy having 1 to 3 carbons or alkylthio having 1 to 3 carbons;
R^3 is selected from the group consisting of hydrogen, alkyl having 1 to 8 carbons, hydroxymethyl, methoxymethyl,



wherein R^{11} is hydrogen, alkyl having 1 to 3 carbons, fluoro or chloro; R^{12} is hydrogen, alkyl having 1 to 3 carbons or alkylthio having 1 to 3 carbons; and n is an integer from 0 to 3;
provided that when R^3 is said



R^2 must be t-octyl.

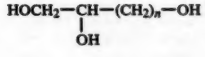
4,876,368

PRODUCTION OF MONOHYDROXY MONOCYCLIC ACETALS AND THEIR ESTERS

Jerry A. Broussard, Summit, N.J.; Wayne C. Fuqua, Boulder, Colo., and James H. George, Portland, Tex., assignors to Hoechst Celanese Corporation, Bridgewater, N.J.

Filed May 24, 1988, Ser. No. 197,936
Int. Cl.[4] C07D *319/06, 317/20, 321/06*
U.S. Cl. 549—374 **12 Claims**

3. A process comprising reacting a composition comprising a trihydroxy alcohol selected from the group consisting of trimethylolpropane, trimethylolethane and compounds of the formula:



where n is 1 to 4, with an aldehyde having the formula:

R'CHO

where R' is hydrogen, C_1-C_3 alkyl, or C_1-C_3 halogenated alkyl, to produce a monohydroxy monocyclic acetal and at least one heavier condensation product having a higher molecular

weight and higher boiling point than said monohydroxy monocyclic acetal, separating said monohydroxy monocyclic acetal from said heavier condensation product, and subjecting at least part of said heavier condensation product to acetal formation conditions to produce an additional amount of said monohydroxy monocyclic acetal.

4,876,369

PROCESS FOR SYNTHESIZING CHROMANES

Richard Barner, Witterswil, and Josef Hübscher, Nunningen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 23, 1988, Ser. No. 235,257

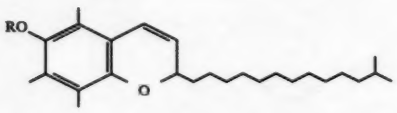
Claims priority, application Switzerland, Aug. 25, 1987, 3244/87

Int. Cl.[4] C07D *311/70*

U.S. Cl. 549—411 8 Claims

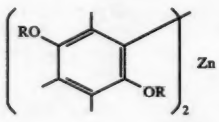
1. A process for preparing a compound of the formula

V



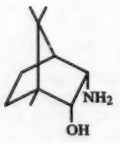
wherein OR forms a hydrolyzable ether group, comprising reacting phytenal with a metal organic compound of the formula

II



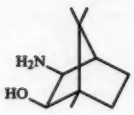
wherein R is as above in the presence of a chiral catalyst of the formula

III



or

IV



4,876,370

1,3,5-NONATRIENE DERIVATIVES, THEIR PREPARATION AND THEIR USE

Lucette Duhamel, and Pierre Duhamel, both of Mont Saint Aignan, France, assignors to Rhone-Poulenc Sante, Antony, France

Filed Sep. 19, 1988, Ser. No. 245,920

Claims priority, application France, Sep. 22, 1987, 87 13055

Int. Cl.[4] C07D *317/16;* C07C *47/21, 43/303*

U.S. Cl. 549—455 2 Claims

1. A 1,3,5-nonatriene derivative of the formula:

in which either R_1 and R_2, together with the carbon atom to which they are linked, form a carbonyl group or R_1 and R_2 each denote an alkoxy radical of 1 to 4 carbon atoms or R_1 and R_2 together form an alkylenedioxy radical.

4,876,371

PROCESS OF PRODUCING GLYCIDYL ETHERS OF MONOHYDRIC OR POLYHYDRIC PHENOLS

Iko Ito; Yoshiki Toyoshima, both of Ehime; Hisao Takagishi, Kyoto, and Tsutomu Takahashi, Ehime, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 650,465, Sep. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 489,296, Apr. 28, 1983, abandoned. This application May 29, 1987, Ser. No. 56,319

Claims priority, application Japan, Apr. 28, 1982, 57-71838; Apr. 28, 1982, 57-71839

Int. Cl.[4] C07D *301/28*

U.S. Cl. 549—517 1 Claim

1. A process of producing glycidyl ethers of monohydric or polyhydric phenols which comprises:

mixing a monohydric or polyhydric phenol, dioxane or diethoxyethane, and epichlorohydrin, wherein the amount of dioxane or diethoxyethane is in the range of 10 to 100 parts by weight per 100 parts by weight of epichlorohydrin, and the amount of epichlorohydrin is in the range of 2.5 to 20 mols per mol of the phenolic hydroxy group,

gradually adding to the mixture an aqueous solution of an alkali metal hydroxide in an amount in the range of 0.9 to 1.1 mols per mol of the phenolic hydroxyl group and subjecting to azeotropic distillation water, dioxane or diethoxyethane, and epichlorohydrin at a temperature of about 56° C. to about 72° C. and a pressure of about 150 mmHg to about 250 mmHg,

maintaining the water content of the mixture in the range of from 0.2 to 2.5 wt%, followed by liquefication of the distillate to be divided into an aqueous layer and an organic layer, and

circulating the organic layer to the mixture whereas eliminating the aqueous layer.

4,876,372

METHOD FOR PREPARING EPICHLOROHYDRINS

Takehisa Nakanishi, Takaishi; Eizi Koga, Izumi, and Isao Fukada, Takaishi, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Apr. 13, 1988, Ser. No. 181,181

Claims priority, application Japan, Apr. 16, 1987, 62-91899; Feb. 4, 1988, 63-22730

Int. Cl.[4] C07D *301/19*

U.S. Cl. 549—529 8 Claims

1. A method for preparing epichlorohydrins, which comprises:

reacting a 2-alkylallyl chloride, wherein the alkyl substituent contains from 1 to 3 carbon atoms, with an alkyl hydroperoxide in the presence of a catalyst having titanium atoms bound to a silicon dioxide carrier via oxygen atoms and having at least three but not more than 6 silanol groups per square nanometer of the carrier, said catalyst having been heat treated at a temperature ranging from 100° C. to 250° C.

4,876,373
METHOD OF MANUFACTURING ORGANOPOLYSILOXANE HAVING TERMINAL ALKENYL GROUPS

Tadashi Okawa, and Toshio Suzuki, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

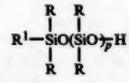
Filed Aug. 31, 1988, Ser. No. 242,237
Claims priority, application Japan, Aug. 31, 1987, 62-217293; Apr. 28, 1988, 63-107345
Int. Cl.[4] C07F 7/08
U.S. Cl. 556—453 7 Claims

1. A method of manufacturing a organopolysiloxane having terminal alkenyl groups as represented by the formula

comprising polymerizing a cyclic trisiloxane with the formula

using as a polymerization initiator an alkali metal salt of an organosilane or organopolysiloxane as represented by the formula

in the presence or absence of a molecular weight regulator which is an organosilane or organopolysiloxane as represented by the formula



and then terminating the reaction,

wherein R^1 represents an alkenyl group, R represents a single-charge hydrocarbon group or single-charge halogenated hydrocarbon group of the same or different types, A represents an alkali metal, m is 0 or an integer of 1 or above, p is 0 or an integer of 1 or above and may be equal to or different from the value of m, B represents a hydrogen atom or a single-charge group selected from among terminal ending groups, and n meets the conditions of $n>m+3$, and the molar ratio of the polymer initiator and the molecular weight regulator are in a range of 100:0 to 0.1:100.

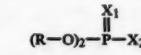
4,876,374
PROCESS FOR MANUFACTURING AMIDES

Paul E. Adams, and Darryl W. Kinzer, both of Willoughby Hills, Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed May 22, 1987, Ser. No. 54,172
Int. Cl.[4] C07F 9/40
U.S. Cl. 558—109 9 Claims

1. A process for producing amide compounds comprising the steps of:

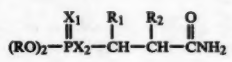
reacting an aqueous acrylamide (I) and a phosphorus-containing acid having the following general structural formula: (II)



(II)

wherein R is hydrocarbyl and X_1 and X_2 are independently selected from the group consisting of sulfur and oxygen, the reacting being carried out by concomitantly combining substantially stoichometrically equal amounts of acrylamide present in the aqueous acrylamide (I) and phosphorus-containing acid (II); and

obtaining a reaction product in the form of an amide having the following general structural formula: (III)



(III)

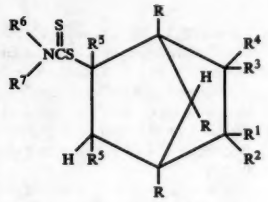
wherein R is hydrocarbyl, R_1 and R_2 are independently hydrogen or methyl and X_1 and X_2 are independently selected from the group consisting of sulfur and oxygen.

4,876,375
NORBORNYL DITHIOCARBAMATES

William Y. Lam, Ballwin, Mo., assignor to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Filed May 2, 1988, Ser. No. 189,101
Int. Cl.[4] C07C 155/08
U.S. Cl. 558—235 4 Claims

1. Compounds having the formula:



(A)

wherein:

a. each of R, R^2 and R^4 when taken singly is a hydrogen atom, an alkyl group containing from 1 to 15 carbon atoms, an aryl group consisting of a benzene or a naphthalene group containing from 6 to 15 carbon atoms or a cycloalkyl group containing from 4 to 10 carbon atoms;

b. each of R^1 and R^3 when taken singly is a hydrogen atom, an alkyl group containing from 1 to 15 carbon atoms; an aryl group consisting of a benzene or a naphthalene group containing from 6 to 15 carbon atoms; a cycloalkyl group containing from 4 to 10 carbon atoms or an alkenyl group containing from 2 to 10 carbon atoms or R^1 or R^3 taken together form the group —CHYCY=CY— in which Y is a hydrogen atom or a methyl group or R^1 together with R^2 form an alkylidene group containing from 1 to 6 carbon atoms;

c. R^5 is a hydrogen atom or an alkyl group containing from 1 to 15 carbon atoms;

d. R^6 is an organic radical selected from an alkyl group, an alkenyl group, an aryl group or an aralkyl group in which the alkyl or alkenyl groups contain up to 32 carbon atoms and the aryl or aralkyl groups are selected from benzene and naphthalene groups which contain up to 15 carbon atoms each; and

e. R^7 hydrogen or an organic radical selected from an alkyl group or alkenyl group, an aryl or aralkyl group in which the alkyl or alkenyl groups contain up to 32 carbon atoms

and the aryl or aralkyl groups are selected from benzene and naphthalene groups which contain up to 15 carbon atoms each.

4,876,376

PROCESS FOR THE HALOGENATION, NITRATION AND FLUORINATION OF AROMATIC DERIVATIVES

Michael Desbois, Rillieux, and Camille Disdier, Lyons, both of France, assignors to Rhone-Poulenc Specialistes Chimiques, Courbevoie, France

Continuation of Ser. No. 874,831, Jun. 16, 1986, abandoned, which is a continuation of Ser. No. 623,464, Jun. 22, 1984, abandoned. This application Dec. 15, 1987, Ser. No. 134,539
Claims priority, application France, Jun. 23, 1983, 83 10371
Int. Cl.[4] C07C *148/00, 118/00, 76/02*
U.S. Cl. 558—412 **21 Claims**

1. A process for the halogenation, nitration and fluorination of an aromatic compound corresponding to the formula:

$$Ar—(ACX_1X_2Y)_n$$

in which:

Ar is a monocyclic or polycyclic aromatic radical which may contain at least one substituent other than said —(ACX_1X_2Y) group(s);

A is a covalent bond, oxygen or sulfur;

X_1 and X_2, which are identical or different, are a halogen;

Y is selected from the group consisting of hydrogen, a halogen and an optionally halogenated alkyl chain having 1 to 3 carbon atoms;

wherein the halogens corresponding to X_1, X_2 and Y are identical or different, but at least one of them is other than fluorine; and

n is equal to 1 or 2;

comprising the step of reacting, in the substantial absence of a halogenation or nitration catalyst other than liquid hydrofluoric acid, the aromatic compound simultaneously or successively with a halogen and a nitrating agent, in liquid hydrofluoric acid for a time sufficient to effect halogenation and nitration of the aromatic ring of said aromatic compound and to effect halogen-fluorine exchange on said —(ACX_1X_2Y) groups(s),

with the proviso that when A is oxygen or sulfur, the halogen-fluorine exchange occurs on the carbon atom located in the alpha-position to either the oxygen or sulfur atom.

4,876,377

ALKYLATION OF AROMATIC AMINES WITH OLEFINS ON PARTIALLY DEALUMINATED ZEOLITES

Rakesh Agrawal; Steven R. Auvil, both of Allentown, Pa., and Michel Deeba, North Brunswick, N.J., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 796,465, Nov. 8, 1985, Pat. No. 4,740,620, and a continuation-in-part of Ser. No. 848,000, Apr. 2, 1986, abandoned. This application Mar. 22, 1988, Ser. No. 171,602
The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.
Int. Cl.[4] C07C *87/452*
U.S. Cl. 558—416 **19 Claims**

1. In a process for producing an alkylated aromatic amine by contacting an aromatic amine with an olefin in the presence of a zeolitic catalyst system, the improvement wherein enhanced activity and selectivity to ortho-alkylated amine product is obtained which comprises contacting the aromatic amine and olefin with a highly acidic zeolite having a acidity factor such that at least 0.3 mm ammonia are irreversibly absorbed at 200° C. per gram of catalyst for 2 hours and which has been partially dealuminated in an amount sufficient to remove at least 10% by weight by the original alumina from the zeolite.

4,876,378

RECOVERY OF DIALKYL NAPHTHALENE-2,6-DICARBOXYLATES FROM NAPHTHALENE-2,6-DICARBOXYLIC ACID-CONTAINING POLYESTERS

Dale E. Van Sickle, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 23, 1988, Ser. No. 197,232
Int. Cl.[4] C07C *67/60, 69/76*
U.S. Cl. 560—78 **22 Claims**

1. A process for the formation of dialkyl naphthalene-2,6-dicarboxylates from a polymer or polymer mixture containing poly(alkylene naphthalene-2,6-dicarboxylate), said process comprising heating a mixture comprising:

(i) said polymer or polymer mixture,

(ii) at least one alcohol having 1 to 5 carbon atoms or a diol having 1 to 5 carbon atoms, and

(iii) at least one transesterification catalyst,

wherein said heating is carried out under suitable conditions of temperature and pressure for a time sufficient to at least partially alcoholize said mixture.

4,876,379

OXIDATIVE ALKOXYCARBONYLATION OF AMINES AND AMINE DERIVATIVES

Carl A. Udovich, Joliet, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 101,126, Sep. 21, 1987, abandoned. This application Nov. 9, 1988, Ser. No. 269,237
Int. Cl.[4] C07C *125/073*
U.S. Cl. 560—158 **8 Claims**

1. In an elevated temperature and pressure process for making a carbamate by carbonylating a substance selected from the group consisting of phenylene or tolylene diamine, phenylene or tolylene diformamide, phenylene or tolylene diurea, phenylene or tolylene dihydrazine, and compounds of formula $R(NHCOH)_2$, wherein R is an alkylene group, —$(CH_2)_x$—, in which x runs between two and six, with carbon monoxide in the presence of a C_1 to C_3 alkanol, an oxygen transfer agent, and a catalyst comprising a palladium compound, the improvement which uses pyridine N-oxide as said oxygen-transfer agent.

4,876,380

COLOR REDUCTION OF POLYMERIC ISOCYANATES VIA MULTIPLE SOLVENT FRACTIONATION

Lao-Jer Chen, and Steven B. Lowenkron, both of Houston, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 31, 1988, Ser. No. 239,082
Int. Cl.[4] C07C *143/00*
U.S. Cl. 560—352 **16 Claims**

1. A process for extracting a crude organic polyisocyanate obtained from the phosgenation of a precursor organic polyamine to form a purified fraction and a residual fraction said process comprising:

1. extracting said crude polyisocyanate in a first extractor with a solvent pair comprising at least one first solvent capable of solubilizing substantially all of said crude polyisocyanate and at least one second solvent capable of solubilizing all but the high boiling higher polymeric components present in said crude polyisocyanate thereby forming a first top layer comprising said second solvent and a first bottom layer comprising said first solvent;

2. passing said first bottom layer, optionally through an evaporator, to a second extractor;

3. extracting said first bottom layer in said second extractor with said solvent pair set forth above thereby forming a second top and second bottom layers;

4. passing said second top layer through an evaporator to recover said second solvent as overhead and said purified fraction as residue; and

5. passing said second bottom layer, optionally through an

evaporator, and in combination with said first top layer to an evaporator to recover said second solvent, and, optionally, said first solvent as overhead and said residual fraction as residue.

4,876,381

NAPHTHALENE DERIVATIVES POSSESSING A RETINOID-TYPE ACTION, PROCESSES FOR THEIR PREPARATION, AND MEDICINAL AND COSMETIC COMPOSITIONS CONTAINING THESE DERIVATIVES

Gérard Lang, Saint Gratien; Jean Maignan, Tremblay les Gonesse; Serge Forestier, Claye-Souilly; Serge Restle, Aulnay sous Bois; Alain Lagrange, Chatou, and Braham Shroot, Antibes, all of France, assignors to L'Oreal, Paris, France

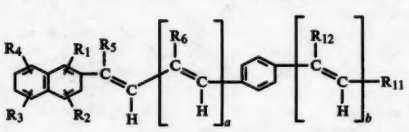
Filed Aug. 18, 1987, Ser. No. 86,934

Claims priority, application Luxembourg, Sep. 28, 1984, 85558

Int. Cl.[4] C07C *67/76*

U.S. Cl. 560—56 **29 Claims**

1. A compound corresponding to the general formula (II)



(II)

or an isomer or salt thereof, in which formula:

a and b are independently 0 or 1,

R_1, R_2, R_3 and R_4, which may be present on one or other of the rings or on both simultaneously, independently represent a hydrogen atom, a linear or branched C_1–C_6-alkyl radical or a C_1–C_4-alkoxy radical,

R_6 represents a C_1–C_6-alkyl radical,

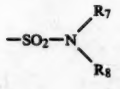
R_5 and R_{12} independently represent a hydrogen atom or a C_1–C_6-alkyl radical, with the proviso that R_5 cannot represent hydrogen if a=b=0 and

R_{11} represents a —COR_9 group, in which R_9 represents

(a) a hydrogen atom, a C_1–C_6-alkyl radical, an amino radical, an optionally substituted arylamino radical or optionally substituted benzylamino radical, a heterocyclic amino radical, a C_1–C_6-alkylamino radical, or a di(C_1–C_6)alkylamino radical, the alkyl chains of said alkylamino or dialkylamino radicals being optionally substituted by one or more hydroxyl groups and/or contain a chain hetero-atom, the group —COR_9, where it is an amide group, moreover optionally being the amide group of an aminoacid or glucosamine, or

(b) an OR_{10} radical, where R_{10} represents a hydrogen atom, a C_1–C_6-alkyl radical, a monohydroxy or polyhydroxy-C_2–C_6-alkyl radical or a substituted or unsubstituted aryl or benzyl radical, or OR_{10} is derived from a sugar of formula $R_{10}OH$, and

R_{11} can also, if b=0, represent a hydroxyl radical, a C_1–C_4-alkoxy radical, a C_1–C_6-alkyl radical, a C_1–C_6-alkylthio radical, a C_1–C_6-alkylsulphinyl radical, a C_1–C_6-alkylsulphonyl radical or a sulphonamide radical of the formula (III)



(III)

where R_7 represents a C_1–C_6-alkyl radical and R_8 either a hydrogen atom or a C_1–C_6-alkyl radical, and R_{11} can also represent a radical of the formula (IV)

(IV)

in which formula R_8 is as defined above.

4,876,382

PROCESS FOR MAKING FLUOROBENZOIC ACID FLUOROPHENYLESTERS

Yasunobu Nishimura, Kamifukuoka, and Toshikazu Kawai, Kawagoe, both of Japan, assignors to Central Glass Company, Limited, Ube, Japan

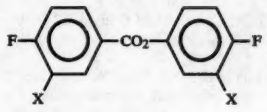
Filed Jan. 13, 1988, Ser. No. 143,636

Claims priority, application Japan, Jan. 30, 1987, 62-18507; Jan. 30, 1987, 62-18508

Int. Cl.[4] C07C *69/76*

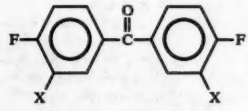
U.S. Cl. 560—109 **4 Claims**

1. A method of preparing a fluorophenyl fluorbenzoate represented by the formula (3),



(3)

wherein X is F or Cl, comprising oxidizing a fluorobenzophenone represented by the formula (2) in an organic solvent by using trifluoroacetic acid and hydrogen peroxide,



(2)

wherein X is F or Cl;

wherein at least 1 mol of trifluoroacetic acid is used per mole of the fluorobenzophenone to be oxidized; and

wherein the oxidation of the fluorobenzophenone is carried out at a temperature not higher than 50° C.

4,876,383

AMINO ACID DERIVATIVES, THEIR PRODUCTION AND USE IN PREPARING CARBAPENEM AND CARBAPENAM COMPOUNDS

Shigeo Nozoe, and Tomihisa Ohta, both of Sendai, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

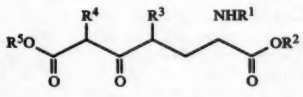
Filed Sep. 11, 1987, Ser. No. 95,445

Claims priority, application Japan, Sep. 12, 1986, 61-215093

Int. Cl.[4] C07C *101/34*

U.S. Cl. 560—163 **6 Claims**

1. An amino acid derivative of formula (I) and having the (S)-configuration in the α-position relative to the amino group,



(I)

wherein R^1 is an N-protecting organic group capable of being removed under reducing conditions, R^2 and R^5 are, independently, hydrogen or a carboxylic-protecting group, R^3 is hydrogen, C_{1-3} alkyl, hydroxyl, methoxy or acetoxy, R^4 is methyl, ethyl, i-propyl, benzyl or a $CH_3CR^6(OR^7)$-organic group in which R^6 is hydrogen or methyl and R^7 is hydrogen or a hydroxyl-protecting group.

4,876,384

RADIATION-HARDENABLE DILUENTS

Francis A. Higbie, Bound Brook, N.J.; Robert A. LieBerman, Naperville, Ill., and Ira M. Rose, Millburn, N.J., assignors to Diamond Shamrock Chemicals Co., Dallas, Tex.

Continuation-in-part of Ser. No. 725,801, Apr. 22, 1985, abandoned, and a continuation-in-part of Ser. No. 797,483, Nov. 13, 1985, abandoned. This application Apr. 8, 1986, Ser. No. 849,301

Int. Cl.[4] C07C *69/52*

U.S. Cl. 560—224 8 Claims

1. A lower alkyl ether acrylate which is mono-methoxy, ethoxylated neopentyl glycol monoacrylate having an average of about two moles of ethylene oxide.

4,876,385

BATCH OR SEMICONTINUOUS PSEUDOCUMENE OXIDATION AND CATALYST RECOVERY AND RECYCLE

Neal R. Nowicki, St. Charles, and Donald E. Thomka, Romeoville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 790,379, Oct. 23, 1985, Pat. No. 4,769,488, which is a continuation-in-part of Ser. No. 565,915, Dec. 27, 1983, abandoned. This application Mar. 25, 1988, Ser. No. 173,711

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[4] C07C *51/265*

U.S. Cl. 562—414 6 Claims

1. A process for producing trimellitic acid by the liquid-phase oxidation of pseudocumene in a batch process with an oxygen-containing gas in a solvent at an elevated temperature and pressure and in the presence of an oxidation catalyst comprising cobalt,manganese, and bromine components to produce an oxidation reactor effluent wherein weight ratio of said solvent to said pseudocumene is in the range of from about 19:1 to about 3:1 at a minimum reactor pressure which maintains a substantial liquid phase of said pseudocumene and at least 70 percent of said solvent, and said solvent is selected from the group consisting of any C_2–C_6 fatty acid and water, and mixtures thereof, the improvement in combination therewith comprising at least a portion of the cobalt and manganese catalyst components initially contacted with the pseudocumene and oxygen-containing gas is in the form of recovered oxalate salts of cobalt and manganese and wherein these salts have been obtained from the addition of solid oxalic acid, metal oxalates, or solutions thereof to said reactor effluent and recovering these salts by high temperature physical separation conducted at a temperature of about 250° F. to about 375° F. prior to separating trimellitic acid product cake from mother liquor wherein the metal oxalates are preheated at a temperature of about 400° F. to about 500° F. in the reaction solvent prior to recycle to the liquid-phase oxidation.

4,876,386

PROCESS FOR THE OXIDATION OF DI- OR TRIMETHYLBENZENES IN THE PRESENCE OF COBALT AND MANGANESE FROM OXIDATION RESIDUE INCINERATOR ASH

Juergen K. Holzhauer, Naperville; Dennis J. Michalak, Warrenville, and Wayne P. Schammel, Naperville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 62,965, Jun. 17, 1987, Pat. No. 4,786,621. This application May 26, 1988, Ser. No. 199,022

Int. Cl.[4] C07C *51/265*

U.S. Cl. 562—414 19 Claims

1. A process for the oxidation of di- or trimethylbenzenes with molecular oxygen under liquid-phase conditions in the presence of a recovered and recycled cobalt and manganese catalyst, which has been recovered by heating oxidation incinerator ash in the presence of acetic acid and a reducing agent wherein the weight ratio of acetic acid to said oxidation incinerator ash is from about 1:1 to about 50:1, and the ratio of electrons which the reducing agent can deliver to atoms of the cobalt plus manganese in the oxidation incinerator ash is from about 0.1:1 to about 4:1 at about the boiling point of the acetic acid at atmospheric pressure and recovering the cobalt and manganese in liquid solution as the metal acetic acid salt, wherein the oxidation is carried out at a temperature of from about 100° C. to about 250° C.

4,876,387

PROCESS FOR PREPARING 2,4,5-TRIFLUOROBENZOIC ACID

Deanne M. Nowak, Depew, and Henry C. Lin, Grand Island, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Feb. 27, 1989, Ser. No. 315,763

Int. Cl.[4] C02C *63/04*

U.S. Cl. 562—493 5 Claims

1. A process for preparing 2,4,5-trifluorobenzoic acid, said process comprising the steps of:

(a) reacting 4,5-difluoroanthranilic acid with a mineral acid to form the corresponding amine salt;

(b) converting said amine salt to the corresponding diazonium tetrafluoroborate; and

(c) heating said tetrafluoroborate to cause decomposition of it to 2,4,5-trifluorobenzoic acid.

4,876,388

METHOD FOR THE PURIFICATION OF TRIFURALINE

Guido Ravetta, Milan, Italy, assignor to I.PI.CI. S.p.A., Novate, Italy

Continuation of Ser. No. 892,384, Jul. 31, 1986, abandoned. This application May 20, 1988, Ser. No. 196,880

Int. Cl.[4] C07C *85/26*

U.S. Cl. 564—437 8 Claims

1. A method of purifying trifluralin, which comprises:

passing saturated steam at a temperature of from 105° to 110? C. through the trifluralin, kept in the liquid state at a temperature of from 50° to 110? C., the pressure being regulated so as to avoid substantial condensation of the steam in the reactor;

continuing the emmission of steam until a quantity of steam corresponding to from 1 to 4 times the weight of the trifluralin has been passed through the liquid trifluralin; and

recovering the purified trifluralin after the removal of any aqueous phase which may have formed during the treatment with the steam.

4,876,389

PROCESS FOR THE PRODUCTION OF ORGANIC POLYSULPHIDES AND CATALYST SYSTEM FOR ITS USE

Henri Gongora, Billere, and Yves Darche, Orthez, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Nov. 27, 1987, Ser. No. 126,008

Claims priority, application France, Nov. 28, 1986, 86 16615

Int. Cl.[4] C07C *148/00*

U.S. Cl. 568—26 19 Claims

1. A process for the production of organic polysulphides of the type R—S_n—R, where R is a hydrocarbon group and n a number from 2 to 8, by heating one or more mercaptans with sulphur, in the presence of a catalyst, said catalyst being obtained by condensing one molar equivalent of a mercaptan with 1 to 20 molar equivalents of an alkylene oxide in the presence of 0.01 to 11.5 molar equivalent of an alkaline base.

4,876,390

PROCESS FOR SEPARATING DICHLORODIPHENYLSULFONE ISOMERS

Beth McCulloch, Barrington, Ill., assignor to UOP, Des Plaines, Ill.

Filed Aug. 19, 1988, Ser. No. 233,706
Int. Cl.[4] C07C 147/06
U.S. Cl. 568—34 9 Claims

1. A process for separating an isomer of dichlorodiphenylsulfone from a feed mixture containing 4,4'-dichlorodiphenylsulfone and at least one other isomer thereof, which comprises contacting at adsorption conditions said mixture with an adsorbent comprising a type Y or type X zeolite having cations selected from Group IA or IIA metals and ammonium at exchangeable cation sites, adsorbing said other isomers to the substantial exclusion of said 4,4'-dichlorodiphenylsulfone, removing the nonadsorbed 4,4'-dichlorodiphenylsulfone from contact with said adsorbent as raffinate product and thereafter desorbing said other isomers by desorption at desorption conditions with a desorbent comprising an aliphatic alcohol having 4–8 carbon atoms.

4,876,391

PROCESS FOR PREPARATION AND PURIFICATION OF BISPHENOLS

Gaylord M. Kissinger, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Sep. 15, 1988, Ser. No. 244,370
Int. Cl.[4] C07C 37/68, 37/86, 39/16
U.S. Cl. 568—724 6 Claims

1. A process which comprises

(a) contacting an excess of phenol with acetone in the presence of an acidic ion exchange resin catalyst;

(b) recovering thereafter a stream from the acidic ion exchange resin catalyst including bisphenol-A, unreacted phenol, isomer of

bisphenol-A and acid impurities derived from the acidic ion exchange resin catalyst;

(c) removing a major portion of bisphenol-A

from the stream of (b);

(d) separating the stream including phenol, a small portion of bisphenol-A, isomers of bisphenol-A, and acidic impurities derived from the acidic ion exchange resin catalyst into a major stream and a minor stream by volume;

(e) introducing into the minor stream created at step (d) sufficient quantities of a tetraorganoammonium borohydride to effectively offset the acidic impurities derived from the acidic ion exchange resin catalyst; and

(f) recovering from the small stream desirable dihydric phenol.

4,876,392

PROCESS FOR PREPARATION OF KEYSTONES BY OXIDATION OF SECONDARY ALCOHOLS USING A TRIMETALLIC CATALYST COMPRISING MOLYBDENUM, RHENIUM AND A GROUP VIII NOBLE METAL

Chuen Y. Yeh, Edison, and Charles Savini, Warren, both of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Division of Ser. No. 776,228, Sep. 16, 1985, Pat. No. 4,737,482, which is a division of Ser. No. 516,901, Jul. 25, 1983, Pat. No. 4,560,803, which is a continuation-in-part of Ser. No. 420,626, Sep. 21, 1982, abandoned. This application Mar. 28, 1988, Ser. No. 174,126
The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.
Int. Cl.[4] C07C 45/00, 45/50
U.S. Cl. 568—404 7 Claims

1. A process for preparing ketones which comprises contacting a secondary aliphatic alcohol in the gaseous phase with water vapor and molecular oxygen in a reaction zone containing a non-halide catalyst to form the ketone corresponding to said alcohol said catalyst having been prepared by the steps of:

(a) impregnating a thermally decomposable molybdenum compound on a catalyst support, and drying and calcining said impregnated catalyst;

(b) impregnating the solids contained in step (a) with a thermally decomposable rhenium compound or complex and drying and calcining the thus-produced solids impregnated with molybdenum and rhenium;

(c) further impregnating the solids obtained in step (b) with at least one thermally decomposable compound or complex of a Group VIII noble metal, and said noble metal-impregnated solids are dried and calcined, thereby forming a trimetallic supported catalyst comprising molybdenum, rhenium and a Group VIII noble metal, wherein each said drying and calcining step is conducted in the presence of air; and

(d) contacting the trimetallic supported catalyst obained in step (c) with hydrogeh sulfide to convert the oxide catalyst to the sulfide form, said supported catalyst consisting essentially of from about 0.1 to 10 wt. % of said rhenium (calculated as elemental rhenium); from about 1 to 30 wt. % of molybdenum (calculated as the elemental metal); and from about 0.001 to 5 wt. % of said Group VIII noble metal (calculated as the Group VIII noble metal).

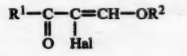
4,876,393

β-FLUOROACYL-β-HALOVINYL ALKYL ETHERS

Hans-Georg Heine, and Pieter Ooms, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 5, 1988, Ser. No. 190,781
Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3715704
Int. Cl.[4] C07C 49/227
U.S. Cl. 568—415 3 Claims

1. A β-fluoroacyl-β-halogenovinyl alkyl ether of the formula



(I)

in which

R^1 is a fluoroalkyl or chlorofluoroalkyl group having 1 to 9 carbon atoms,

Hal is a halogen atom, and

R^2 is an alkyl group having 1 to 7 carbon atoms.

4,876,394

PROCESS FOR THE PRODUCTION OF METHYL TERT.-ALKYL ETHERS

Moez M. Nagji, Stamford, Conn., and Robert E. Trubac, Ridgewood, N.J., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 204,301, Jun. 9, 1988, Pat. No. 4,814,517. This application Jun. 29, 1988, Ser. No. 213,238
Int. Cl.[4] C07L 41/06
U.S. Cl. 568—697 6 Claims

1. A cyclic process for preparing methyl tert.-alkyl ether which comprises the steps of

(a) contacting and reacting in a reaction zone and in the liquid phase a reaction mixture formed by combining a stream consisting essentially of hydrocarbons having from 4 to 5 carbon atoms and containing at least some proportion of an isoalkylene having from 4 to 5 carbon atoms with methanol to form a reaction product comprising methyl tert.-alkyl ether, at least 50 ppm (w) unreacted methanol, unreacted C_4–C_5 hydrocarbons and at least 5 ppm (w) dimethyl ether;

(b) isolating at least 99 percent (v) of the methyl tert.-alkyl ether from the reaction product;

(c) treating the residual portion of the reaction product

containing both dimethyl ether and methanol by passing said residual portion through a first adsorption zone containing an adsorbent for both methanol and dimethyl ether whereby at least 95 weight percent of the methanol present is adsorbed and the weight ratio of adsorbed dimethyl ether to adsorbed methanol is at least 0.05 and a substantially methanol-free effluent is obtained which comprises non-adsorbed C_4–C_5 hydrocarbons and dimethyl ether;

(d) passing the effluent from step (c) through a second adsorption zone containing a selective adsorbent for dimethyl ether and recovering a hydrocarbon effluent;

(e) periodically regenerating the first adsorption zone by passing therethrough a purge fluid, and recycling the desorbed methanol and dimethyl ether to the said reaction zone;

(f) repeating the process of step (a) to produce additional methyl tert.-alkyl ether and a reduced proportion of dimethyl ether with respect to the initial reaction in said reaction zone.

4,876,395

PROCESS FOR COLOR STABILIZATION OF BISPHENOL-A

Gaylord M. Kissinger, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Jul. 11, 1988, Ser. No. 217,722
Int. Cl.[4] C07C *39/12*
U.S. Cl. 568—728 11 Claims

1. A process which comprises

(a) contacting an excess of phenol with acetone in the presence of an acidic ion exchange resin catalyst;

(b) recovering thereafter a stream from an acidic ion exchange resin catalyst, said stream including bisphenol-A unreacted phenol, isomers of bisphenol-A and acid impurities derived from the acidic ion exchange resin catalyst;

(c) removing a major portion of the bisphenol-A from the stream of (b);

(d) adding to the bisphenol-A effective quantities of a Group II-a metal or transition metal of oxidation number +2 carbonate to color stabilize the bisphenol-A;

(e) recovering the solid bisphenol-A and the metal carbonate.

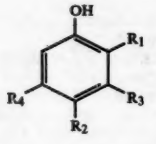
4,876,396

SELECTIVE CHLORINATION OF PHENOLS

Jean-Claude LeBlanc, Grenoble, and Serge Ratton, Villefontaine, both of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Continuation-in-part of Ser. No. 909,177, Sep. 19, 1986, abandoned. This application Jul. 28, 1987, Ser. No. 78,771
Claims priority, application France, Sep. 19, 1985, 85 14093; European Pat. Off., Sep. 3, 1986, 86.420221.3
Int. Cl.[4] C07C *37/62, 39/24*
U.S. Cl. 568—779 13 Claims

1. A process for the selective chlorination, at a position ortho to a hydroxyl group thereof, of a phenolic compound having the general formula (I):



(I)

in which R_2 is hydrogen, an alkyl radical having from 1 to 4 carbon atoms, an alkoxy radical having from 1 to 4 carbon atoms, an acyloxy radical having from 2 to 4 carbon atoms, an acyl radical having from 2 to 4 carbon atoms, a carboxyl radical, an ester radical —$COOR_5$, wherein R_5 is a straight or branched chain alkyl radical having from 1 to 4 carbon atoms, a nitrile radical, an —OH radical, or a —CHO radical; R_1 is hydrogen or one of the substituents R_2; and R_3 and R_4, which may be identical or different, are each hydrogen or one of the substituents R_2; comprising reacting said compound (I) with gaseous chlorine, in a solvent free, molten reaction medium and at a temperature no greater than about 150° C., in the presence of a catalytically effective amount of a primary, secondary or tertiary amine.

4,876,397

METHOD FOR PRODUCTION OF PHENOL/ACETONE FROM CUMENE HYDROPEROXIDE

John F. Knifton, and Neal J. Grice, both of Austin, Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Oct. 24, 1988, Ser. No. 261,819
Int. Cl.[4] C07C *37/08, 45/53*
U.S. Cl. 568—798 13 Claims

1. In a method for cosynthesis of phenol and acetone by acid-catalyzed decomposition over a catalyst, the improvement comprising reacting cumene hydroperoxide over a heterogeneous catalyst consisting of a compound from the group consisting of fluorophophoric acids and hydrogen fluorides on an inert support at a temperature of about 20° C. to 150° C. and a pressure of from zero to 1000 psig.

4,876,398

PREPARATION OF ORTHO-ALKYLATED PHENOLS IN THE PRESENCE OF A CATALYST PREPARED BY CO-PRECIPITATION PROCESS

Trong-Goang Lin, Hsinchu; Ling-Wen Ho; An-Nan Ko, both of Taipei, and Yeong-Ju Perng, Miaoli, all of Taiwan, assignors to China Petrochemical Development Corporation, Taipei, Taiwan

Filed Jun. 10, 1988, Ser. No. 206,834
Int. Cl.[4] C07C *37/16, 37/00*
U.S. Cl. 568—804 9 Claims

1. A process for preparing an ortho-alkylated phenol by a vapor phase catalytic reaction at 200°–500° C. by reacting a vapor phenol compound selected from phenol, ortho-cresol and a mixture of phenol mixed with ortho-cresol and a vapor alcohol selected from methanol

cyclohexanol or an alkyl alcohol

having more than ten carbon atoms, in the presence of a catalyst containing magnesium oxide and maganese oxide, of which the catalyst is prepared by first forming a coprecipitate of magnesium and manganese salt, said coprecipitate being then filtered, water-washed and calcined at 250°–600° C. for 1–4 hours for forming the catalyst consisting of magnesium oxide and manganese oxide having an atomic ratio of Mg/Mn of 100:100 to 100:1, the improvement which comprises:

said coprecipitate of magnesium and manganese salt being prepared by treating an alkali in an aqueous solution having soluble magnesium ion and soluble manganese ion to obtain said coprecipitate of magnesium and manganese salt with respect to the alkali added.

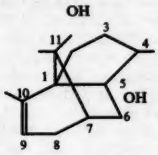
4,876,399

TAXOLS, THEIR PREPARATION AND INTERMEDIATES THEREOF

Robert A. Holton, Tallahassee, Fla.; Rouh-Rong Juo, North Billerica, Mass., and Richard Lowenthal, Tallahassee, Fla., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.

Filed Nov. 2, 1987, Ser. No. 115,665
Int. Cl.[4] C07C *35/37*
U.S. Cl. 568—817 3 Claims

1. A diol of the formula:



4,876,400

PROCESS FOR PRODUCING VITAMIN A OR ITS CARBOXYLIC ACID ESTERS, AND ITERMEDIATE COMPOUNDS USEFUL FOR THE PROCESS

Junzo Otera, Okayama City, Japan; Tadakatsu Mandai, Ithaca, N.Y., and Mikio Kawada, Okayama City, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

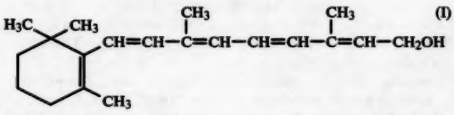
Division of Ser. No. 804,252, Dec. 3, 1985, Pat. No. 4,825,006. This application Jul. 5, 1988, Ser. No. 215,167

Claims priority, application Japan, Jan. 10, 1985, 60-2964; Mar. 1, 1985, 60-41667; Oct. 11, 1985, 60-227549; Oct. 11, 1985, 60-227550; Oct. 16, 1985, 60-232073; Oct. 16, 1985, 60-232074

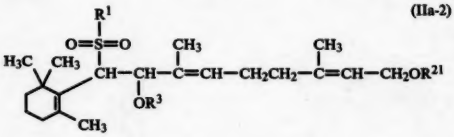
Int. Cl.[4] C07C *35/18*

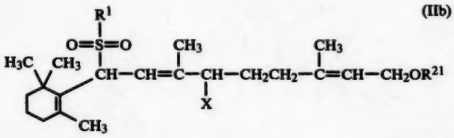
U.S. Cl. 568—824 8 Claims

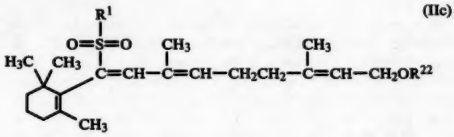
1. A process for producing vitamin A represented by the formula



which comprises treating a compound represented by the formula







wherein R^1 represents an aryl group which may be substituted, R^{21} and R^{22} each represent a hydrogen atom or a lower alkanoyl group, R^3 represents an acetal-type protective group for a hydroxyl group, and X represents a halogen atom, with a base, selected from the group consisting of lower alkoxides of potassium and potassium hydroxide, in a solvent selected from the group consisting of aliphatic hydrocarbons and aromatic hydrocarbons, thereby producing vitamin A substantially maintaining the sterochemistry of the starting compound.

4,876,401

PROCESS FOR THE PREPARATION OF ALKANEDIOLS

Eit Drent, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 9, 1989, Ser. No. 321,247

Claims priority, application United Kingdom, Mar. 18, 1988, 8806526

Int. Cl.[4] C07C *29/17, 31/20*

U.S. Cl. 568—861 21 Claims

1. A process for the preparation of alkanediols which comprises the reacting: (a) a monoalkynically and/or monoalkenically unsaturated diol, wherein the alcohol groups are separated by at least two carbon atoms, which carbon atoms form the alkynic and/or alkenic unsaturated entity respectively, and (b) hydrogen, in the presence of a palladium compound which is at least partially soluble in the reaction medium and a base.

4,876,402

IMPROVED ALDEHYDE HYDROGENATION PROCESS

John E. Logsdon, Houston; Richard A. Loke, Santa Fe, both of Tex.; Jay S. Merriam, Louisville, Ky., and Richard W. Voight, Houston, Tex., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Division of Ser. No. 926,129, Nov. 3, 1986, Pat. No. 4,762,817. This application Apr. 26, 1988, Ser. No. 186,431

Int. Cl.[4] C07C *29/14*

U.S. Cl. 568—881 10 Claims

1. In a heterogenous vapor phase process for producing an alcohol by contacting a mixture of a vaporous stream of the corresponding aldehyde and a hydrogen-containing gas with a solid hydrogenation catalyst the improvement comprising employing as said hydrogenation catalyst a reduced precursor catalyst composition which consists essentially of a mixture of reduced copper oxide-zinc oxide impregnated with a selectivity improving amount of a selectivity enhancer selected from the group consisting of

(a) potassium in an amount of between about 0.5 and 3.5 percent by weight based on the weight of copper oxide and zinc oxide in the precursor catalyst composition before its reduction;

(b) a transition metal selectivity enhancer selected from the group consisting of nickel, cobalt and mixtures thereof in the amount of between about 0.5 and 5.0 percent by weight based on the weight of copper oxide and zinc oxide in the precursor catalyst composition before its reduction; and

(c) a selectivity enhancer comprising the combination of

(i) an alkali metal selectivity enhancer selected from the group consisting of sodium, potassium, lithium, cesium, and mixtures thereof, in an amount of between about 0.05 and 7.0 percent by weight based on the weight of copper oxide and zinc oxide in said precursor catalyst composition before its reduction; and

(ii) a transition metal selectivity enhancer selected from the group consisting of nickel, cobalt, and mixtures thereof, in an amount of between about 0.5 and 5.0 percent by weight based on the weight of copper oxide and zinc oxide in the precursor catalyst composition before its reduction.

4,876,403

PROCESS FOR THE RECOVERY OF ALCOHOLS USING A PERFLUORINATED IONOMER MEMBRANE

Abraham D. Cohen, Sarnia, Canada; William D. Diana, Belle Mead, and James J. Baiel, Morris Plains, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

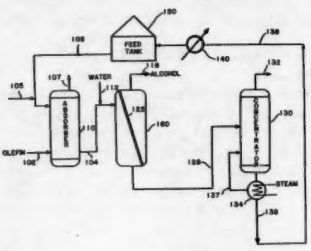
Continuation of Ser. No. 9,794, Feb. 2, 1987, abandoned. This application Mar. 7, 1989, Ser. No. 320,903

Int. Cl.[4] C07C *29/76, 31/10, 31/12*

U.S. Cl. 568—913 36 Claims

1. Process for the separation of alcohol from a feed mixture comprising alcohol, water and acid, which process comprises

contacting the mixture against a first side of a perfluorinated ionomer membrane and withdrawing at a second side of the membrane a permeate comprising alcohol in increased concentration relative to the feed, wherein an aqueous acid solution is recovered to the first side of the membrane, said solution being substantially depleted of alcohol.



4,876,404

PREPARATION OF DICHLOROTRIFLUOROMETHYLTOLUENES INCLUDING NOVEL ISOMERS

Takeshi Kondo, Sayama; Toshikazu Kawai, Kawagoe, and Hideki Oshio, Omiya, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Aug. 11, 1987, Ser. No. 84,019

Claims priority, application Japan, Aug. 13, 1986, 61-188575; Apr. 30, 1987, 62-106570

Int. Cl.[4] C07C *17/20, 17/24, 17/32, 21/24*

U.S. Cl. 570—145 **6 Claims**

1. A method preparing a dichlorotrifluoromethyltoluene, comprising the steps of:

reacting a dichlorotoluene with carbon tetrachloride in 1,2-dichloroethane in the presence of an aluminum halide to thereby obtain crude dichlorotrichloromethyltoluene; and then

reacting said crude dichlorotrichloromethyltoluene with hydrogen fluoride.

4,876,405

PROCESS FOR PREPARING FLUOROETHYLENES AND CHLOROFLUORO-ETHYLENES FROM CHLOROFLUOROETHANES

Claudio Gervasutti, Mestre-Venezia, Italy, assignor to Ausimont S.p.A., Milan, Italy

Filed Jul. 13, 1987, Ser. No. 72,641

Claims priority, application Italy, Jul. 18, 1986, 21171 A/86

Int. Cl.[4] C07C *17/24, 21/18*

U.S. Cl. 570—156 **2 Claims**

1. A process for the selective dehalogenation of chlorofluoroethanes selected from the group consisting of 1,2-difluoro-tetrachloroethane and 1,1-difluorotetrachloroethane and mixtures thereof in gas phase to fluoroethylenes and chlorofluoroethylenes containing at least one hydrogen atom, comprising reacting hydrogen in one step with the chlorofluoroethanes at a temperature ranging from 200° C. to 400° C. with a molar ratio of hydrogen to the chlorofluoroethane ranging from 2 to 5, in the presence of a hydrogenation catalyst selected from palladium and nickel.

4,876,406

PROCESS FOR GASEOUS PHASE FLUORINATION OF ALIPHATIC CHLORINATED OR CHLOROFLUORINATED HYDROCARBONS

Louis Foulletier, Oullins, France, assignor to PCUK-Produits Chimiques Ugine Kuhlmann, Courbevoie, France

Continuation of Ser. No. 429,081, Sep. 30, 1982, abandoned, which is a division of Ser. No. 324,438, Nov. 24, 1981, abandoned. This application Nov. 8, 1984, Ser. No. 669,404

Claims priority, application France, Dec. 29, 1980, 80 27662

Int. Cl.[4] C07C *17/20, 17/09*

U.S. Cl. 570—165 **9 Claims**

1. A gaseous phase fluorination process which comprises contacting aliphatic chlorinated or chlorofluorinated hydrocarbons with hydrofluoric acid in the presence of a catalyst in a fluidized bed reactor, said catalyst consisting essentially of a mixed chromium and aluminum phosphate precipitate having:

(a) a specific surface area greater than about 200 m^2/g, but less than about 1,000 m^2/g,

(b) a surface area of a pores of 40 to 50 Å in radius which is greater than about 5 m^2/g, but less than about 150 m^2/g,

(c) a surface area of pores equal to or above 250 Å in radius which is greater than about 2 m^2/g, but less than about 60 m^2/g, and

(d) a chromium content between about 0.1 and 3 moles per liter.

4,876,407

PROCESS FOR PRODUCING 2,3 DICHLOROBUTADIENE-1,3

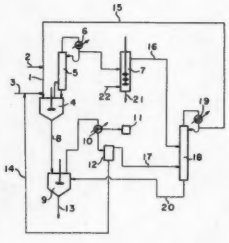
Akihiko Okuda; Yukinori Totake, and Hideki Matsumura, all of Ohmi, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 527,507, Aug. 29, 1983, abandoned, which is a continuation of Ser. No. 318,407, Nov. 5, 1981, abandoned. This application Jun. 11, 1985, Ser. No. 743,273

Claims priority, application Japan, Nov. 27, 1980, 55-166970

Int. Cl.[4] C07C *17/24, 17/34, 21/20*

U.S. Cl. 570—239 **11 Claims**



1. A process for producing 2,3-dichlorobutadiene-1,3 which comprises (i) continuously reacting a mixture of 1,2,3-trichlorobutene-3, a water miscible solvent, an alkali metal hydroxide and water in a reactor; (ii) discharging the resulting 2,3-dichlorobutadiene-1,3, most of said water miscible solvent and a part of the unreacted 1,2,3-trichlorobutene-3 and water in a vapor phase from said reactor by evaporation just after the reaction; (iii) feeding said vapor phase into a distillation column to distillate 2,3-dichlorobutadiene-1,3 and said water miscible solvent from the top; (iv) extracting the distillate with water to separate 2,3-dichlorobutadiene-1,3 from said water miscible solvent; (v) recycling at least 1,2,3-trichlorobutene-3 solution discharged from the bottom, into said reactor; (vi) feeding a mixture of the unreacted 1,2,3-trichlorobutene-3, said water miscible solvent and alkali metal chloride and water discharged from said reactor, into an evaporator to evaporate the unreacted 1,2,3-trichlorobutene-3 and said water miscible solvent; (vii) condensing said vapor into an upper layer and a

lower layer condensate; (viii) recycling said lower layer condensate containing mainly 1,2,3-trichlorobutene-3, into said reactor; (ix) feeding said upper layer condensate containing said water miscible solvent and said water miscible solvent extracted with water in step (iv) into a methanol concentration tower; and (x) recycling said water miscible solvent distilled from the top, into said reactor.

4,876,408

ALKYLATION PROCESS USING A CATALYST HAVING AN INCREASED SELECTIVITY FOR MONOALKYLATION

Charles T. Ratcliffe, La Habra, and John W. Ward, Yorba Linda, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 943,911, Dec. 19, 1986, Pat. No. 4,798,816. This application Oct. 3, 1988, Ser. No. 251,752

Int. Cl.[4] C07C *2/68*

U.S. Cl. 585—467 26 Claims

1. A process for alkylating an aromatic compound to form an alkylated aromatic which comprises contacting said aromatic compound with an alkylating agent under alkylation conditions in the presence of a treated alkylation catalyst having an increased selectivity for monoalkylation produced by the process comprising:

(a) depositing carbonaceous material on an alkylation catalyst which comprises (1) a molecular sieve having catalytic activity for alkylation, said molecular sieve being selected from the group consisting of Y zeolites, fluorided Y zeolites and zeolite beta, and (2) a porous, inorganic refractory oxide, said alkylation catalyst being substantially devoid of hydrogenation metal components, in such a manner as to suppress the alkylation activity of said catalyst; and

(b) contacting the carbon-containing catalyst particles formed in step (a) with a gaseous oxidizing agent at an elevated temperature to remove at least a portion of said carbonaceous material so as to increase the selectivity of said alkylation catalyst for monoalkylation by at least 1.0 percentage point and thereby produce said treated alkylation catalyst.

4,876,409

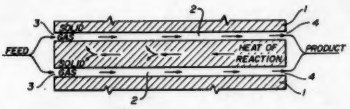
THIN BED COFEED REACTORS FOR METHANE CONVERSION

David W. Leyshon, West Chester, and Robert A. Bader, Overbrook Hills, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 31,496, Mar. 30, 1987. This application Mar. 4, 1988, Ser. No. 158,128

Int. Cl.[4] C07C *2/00*

U.S. Cl. 585—500 7 Claims



1. A method for the oxidative conversion reaction of methane to higher hydrocarbon products and coproduct water wherein a gas mixture comprising methane and a gaseous oxidant is contacted with a solid contact agent in a thin adiabatic reactor bed at reaction conditions, comprising the steps of:

(1) initially heating the gas mixture to reaction temperature, causing an exothermic reaction in the thin aidabatic reactor bed;

(2) thereafter passing the said gas mixture at a temperature at least 100° C. less than reaction temperature into said thin adiabatic reactor bed and heating the gas mixture to reaction temperature by conductive flow of heat generated by said exothermic reaction axially through said bed countercurrent to the flow of said mixture; and

(3) removing a reaction mixture containing said higher hydrocarbons from said bed.

4,876,410

CATALYST SUPPORT, AND CATALYST FOR OLEFIN DIMERIZATION

Warren M. Ewert; Donald H. Kubicek, both of Bartlesville, and Charles A. Drake, Nowata, all of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 112,802, Oct. 23, 1987, Pat. No. 4,810,688. This application Nov. 14, 1988, Ser. No. 271,135

Int. Cl.[4] C07C *2/24*

U.S. Cl. 585—516 17 Claims

1. A dimerization process comprising contacting at least one olefin under dimerization conditions with a catalyst comprising:

(a) at least one elemental alkali metal, and

(b) a support formed by preparing a thick paste comprising an alkali metal carbonate, water, and alcohol, forming a particulate product from said paste, and calcining said particulate product;

wherein said elemental alkali metal is supported on said support.

4,876,411

MODIFIED CRYSTALLINE ALUMINOSILICATE ZEOLITE CATALYST AND ITS USE IN THE PRODUCTION OF LUBES OF HIGH VISCOSITY INDEX

Emmerson Bowes, Hopewell; Clarence D. Chang, Princeton; Scott Han, Lawrenceville, and David S. Shihabi, Pennington, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 815,956, Jan. 3, 1986, abandoned. This application Mar. 19, 1987, Ser. No. 27,034

Int. Cl.[4] C07C *2/02*

U.S. Cl. 585—533 9 Claims

1. A process for the production of high viscosity index lubricating oils in high yields from lower olefin comprising contacting said olefin over a modified crystalline aluminosilicate ZSM-5 zeolite catalyst resulting from a method which comprises:

(a) steaming an synthesized crystalline aluminosilicate ZSM-5 zeolite containing organic template material to decompose at least a portion of said template material and to extract zeolitic aluminum; and

(b) contacting the ZSM-5 zeolite resulting from step (a) in the ammonium, alkali metal or hydrogen form with a dealuminizing agent which forms a water-soluble complex with aluminum to remove a further quantity of zeolitic aluminum therefrom.

4,876,412

ZEOLITE EU-2

John L. Casci, Redcar; Barrie M. Lowe, Edinburgh, and Thomas V. Lowe, Darlington, all of England, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 919,577, Oct. 15, 1986, Pat. No. 4,741,891, which is a continuation of Ser. No. 816,958, Jan. 6, 1986, abandoned, which is a continuation of Ser. No. 272,469, Jun. 11, 1981, abandoned. This application Nov. 13, 1987, Ser. No. 120,526

Claims priority, application United Kingdom, Jun. 12, 1980, 8019211

Int. Cl.[4] C07C *6/00*

U.S. Cl. 585—640 3 Claims

1. A catalytic process for the conversion of methanol to hydrocarbons, which comprises contacting methanol with an acidic catalyst consisting essentially of a calcined form of

zeolite EU-2, in its acid form, having a molar composition expressed by the formula:

0.5 to 1.5 R_2O: Y_2O_3: at least 70 XO_2: 0 to 100 H_2O,

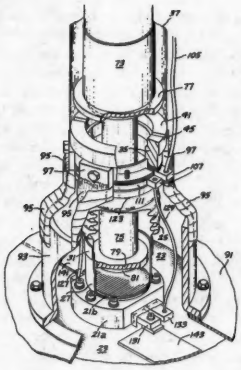
wherein R is hydrogen, Y is one or more of aluminum, iron, gallium or boron, and X is silicon and/or germanium and having an X-ray pattern substantially as set out in Table 1 as determined by standard technique using copper Kα radiation under conversion conditions.

4,876,413

EFFICIENT THERMAL JOINTS FOR CONNECTING CURRENT LEADS TO A CRYOCOOLER

Mark E. Vermilyea, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 5, 1988, Ser. No. 215,131
Int. Cl.[4] F25B *19/00*
U.S. Cl. 174—15.4 **1 Claim**



1. A thermally efficient, electrically insulating joint operable at liquid nitrogen temperatures and below connecting a current lead to a cryocooler heat station comprising:

clamping means;

two indium sheets;

a ceramic spacer wherein said ceramic material is selected from the group consisting of alumina and beryllia, said spacer having two faces situated opposite one another, each one of said indium sheets contacting a respective one of said faces, said ceramic spacer with the indium sheets on either face situated between the current lead and the cryocooler heat station, said clamping means urging said cryocooler heat station and the lead together with sufficient force to cause said indium sheets to conform to the surfaces with which they are in contact.

4,876,414

ELECTRICAL SERVICE FITTINGS AND SERVICE SYSTEM INCLUDING SAME

Ruben R. Johnson, 3609 West Castile Ct., Peoria, Ill. 61615

Filed Mar. 23, 1989, Ser. No. 327,793
Int. Cl.[4] H02G *3/04*
U.S. Cl. 174—81 **18 Claims**

1. A service entrance fitting for receiving electrical cable from the exterior thereof and for channeling the cable to a conduit, comprising:

a dome-shaped hood having a mouth for passing the cable from the exterior into the service entrance fitting, and an integral depending hollow neck for interfacing with a top of the conduit to position the hood in covering relation over the top of the conduit; and

an apertured separator yoke nestingly positionable in the mouth of the hood and having an integral depending hollow neck telescoped over the depending hollow neck of the hood whereby the separator yoke can be readily manipulated in a telescoping direction as well as in a swiveling direction relative to the hood to facilitate feeding the cable into the entrance fitting.

6. A service pass through and distribution fitting for electrical cable channelled through a conduit, comprising:

a dome-shaped hood having a side opening mouth, an integral upwardly projecting hollow neck and an integral downwardly projecting hollow neck, the necks providing interfacing with opposed ends of the conduit, and whereby electrical cable can pass directly through the hollow necks of the fitting and the electrical cable can be distributed out through the side opening mouth of the fitting; and

an apertured separator yoke nestingly positionable in the mouth of the hood.

12. A service system for receiving and distributing electrical cable, comprising:

conduit means having an upper head end and a lower meter end;

a service entrance fitting for coupling to the head end of the conduit means for receiving electrical cable from the exterior thereof and for channeling the cable to the conduit means, including a dome-shaped hood having a mouth for passing the cable from the exterior into the service entrance fitting, and an apertured separator yoke nestingly positionable in the mouth of the hood;

a service pass through and distribution fitting coupled in the conduit means intermediate the ends thereof, including a dome-shaped hood having a side opening mouth and pass through aperture means whereby electrical cable can directly pass through the hood, and an apertured separator yoke nestingly positionable in the mouth of the hood; and

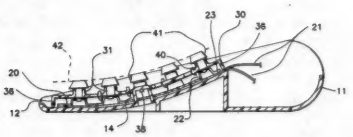
wherein the apertured separator yoke for both the service entrance fitting and the service pass through and distribution fitting are common components of substantially similar construction.

4,876,415

LOW COST KEYBOARD WITH KEY TOPS DEFINING SURFACE OF CURVED PROFILE

Kevin F. Clancy, El Paso, Tex., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Mar. 31, 1989, Ser. No. 175,556
Int. Cl.[4] H01H *9/00, 13/70*
U.S. Cl. 200—5 A **12 Claims**



9. A keyboard comprising:

a base with a concave upper surface thereon, the upper surface being curved about an axis;

a membrane switch assembly overlaying the concave surface on said base, said switch assembly forming a plurality of rows of switches, the rows being generally parallel with said axis, the switches being individually actuatable by exerting force on the switch assembly at the switch location;

an array of resilient frustoconical boots overlaying said switch assembly and arranged in a plurality of rows so that a boot is substantially aligned with each switch location, each boot having a large open end adjacent said switch assembly and a small closed end of which the inner surface contacts the switch assembly when the boot is depressed;

a key holder plate having an array of key guide apertures therethrough and arranged in a plurality of rows so that a key guide aperture is substantially aligned with each switch location, said key holder plate being substantially rigid along the rows of key guide apertures and having graduated flexibility transverse to the rows of key guide apertures, with the area of maximum stiffness located between the outer rows;

a plurality of keys mounted in the key guide apertures for movement toward and away from said base, the outer surfaces of the small ends of said boots abutting said keys so as to bias them away from said base; and

snap retaining means for securing said key holder plate to said base in a concave profile about said axis, said snap retaining means including a plurality of fasteners spaced along the area of maximum stiffness of said key holder plate for restraining said key holder toward said base.

4,876,416

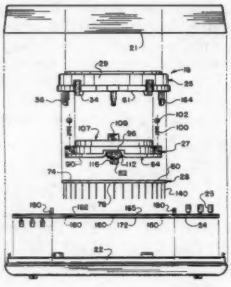
MULTIPLE POSITION ROTARY SWITCH

Leo R. Frantz, Lakewood; Alfred Bauer, Parma; Matthew H. Koran, Olmsted Township, Cuyahoga County, and Jack Becker, South Euclid, all of Ohio, assignors to Actron Manufacturing Company, Cleveland, Ohio

Filed Feb. 3, 1989, Ser. No. 306,536

Int. Cl.[4] H01H *19/58*

U.S. Cl. 200—11 R **21 Claims**



14. An electrical device having a separate multiple position rotary switch comprising an annular cup which serves as a housing for said switch and which receives a knob therein, said knob being retained within said cup by a circuit board which is removably secured to said cup, said cup including an annular race against which said knob rotates and an upstanding cylindrical sidewall, said circuit board comprising a first major surface having a circuit formed thereon and a second major surface, said circuit board being removably secured to said cup such that said first surface of said circuit board is located between said knob and said second surface of said circuit board, said race including a plurality of spaced arcuate protrusions which form multiple peaks and valleys along said race, said knob comprising a cylindrical disk having along one surface a handle and along an opposite surface a protruding rim, said rim including a first pair of diametrically opposed upstanding platforms and a second pair of diametrically opposed upstanding platforms, said first pair of platforms being of sufficient size that upon rotation of said knob said first pair of platforms glide along the peaks of said arcuate protrusions of said race, said second pair of platforms each including a socket for receiving a spring and a ball bearing, said bearing being located on top of said spring such that said ball is sandwiched between said spring and said race, said spring providing a biasing force which retai..s said bearing against said race such that as said knob is rotated said bearing aligns itself in said valleys of said race thereby mechanically stabilizing said knob in preselected positions and between said preselected positions said bearing is received within said socket so as to allow said bearing to glide over said protrusions of said race, said knob including along said opposite end thereof a plurality of wiping members which rotate with said knob and selectively close said circuit formed on said first surface of said circuit board as said knob is rotated to said preselected positions, said circuit board further including openings along said second surface thereof which are electrically connected to said circuit formed on said first surface thereof, said circuit board further including a plurality of upstanding pins extending from said openings of said circuit board for electrically connecting said switch to a mother circuit board of said electrical device.

15. An electrical device as set forth in claim **14** wherein said circuit board of said switch is removably secured to said cup by a plurality of inwardly protruding flexible barbed ears extending from said cup, said flexible barbed ears being capable of deflecting out of position during the alignment of said circuit board upon said cup and also capable of returning to an unflexed position such that said barbed ears engage said circuit board upon proper placement of said circuit board upon said cup thereby securely retaining said circuit board upon said cup.

16. An electrical device as set forth in claim **15** wherein said cup includes a plurality of outwardly protruding barbed ears which attach the switch to said mother circuit board.

4,876,417

COMBINED HIGH VOLTAGE CONNECTING AND GROUNDING SWITCH

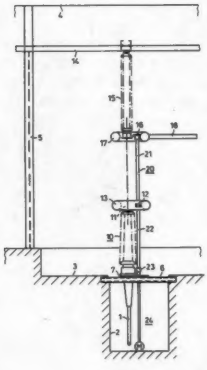
Detlev Niederhuefner; Guenter Hahn, and Andrzej Baczyzmalski, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,674

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1988, 3802394

Int. Cl.[4] H01H *31/00*

U.S. Cl. 200—48 V **6 Claims**



1. A high voltage disconnecting and grounding switch having a support structure and vertical switching movement comprising:

a first contact adapted to have a high voltage potential;

a connection contact connectable with the first contact wherein the first contact and the connection contact are

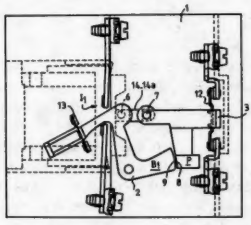
arranged on the support structure vertically one above the other; a grounding contact connectable with the connection contact wherein the connection contact and the grounding contact are arranged on the support structure vertically one above the other; and a vertically translatable switch rod movably mounted to the support structure between closed and open circuit positions, the rod including a conductive section and a nonconductive section, wherein the conductive section connects the first contact and the connection contact when the switch is in the closed position and the conductive section connects the connection contact and the grounding contact when the switch is in the open circuit position.

4,876,418

DEVICE FOR RENDERING CONTACTORS ELECTRICALLY AND MECHANICALLY INOPERATIVE

Bernard Fournier, Le Plessis Bouchard, France, assignor to La Telemecanique Electrique, France

Filed Jun. 24, 1988, Ser. No. 211,017
Claims priority, application France, Jun. 26, 1987, 87 09341
Int. Cl.[4] H01H *9/24*
U.S. Cl. 200—50 C **7 Claims**



1. An interlocking device for rendering electrically and mechanically inoperative one or the other of two contactors each having an actuating member, said device of the type comprising:

i- a flat case with first and second opposite parallel front walls, spaced a small distance apart and each having a central region and, first and second opposite sidewalls which extend in planes substantially perpendicular to the first and second front walls, said case having a fixed pin and being adapted for being mounted between the two contactors disposed side by side :

ii- first and second movement take-offs adapted for respectively coupling with the actuating member of the respective contactors through substantially coaxial apertures provided in the central regions of the first and second front walls respectively, each of said first and second movement take-offs being movable between first and second positions corresponding respectively to the work position and the rest position of the contactor with which it is associated ;

iii- first and second mobile elements providing reciprocal inoperativeness, driven respectively by said first and second movement take-offs, said mobile elements having a travel distance such that when the first movement take-off is in its first position, the first mobile element prevents movement of the second movement take-off to its first position and conversely,

iv- first and second switch devices respectively comprising first and second pairs of fixed contacts, connected respectively by first and second conductor means to first and second input connection elements and to first and second output connection elements, and first and second mobile contact elements respectively actuated by said second and first mobile elements,

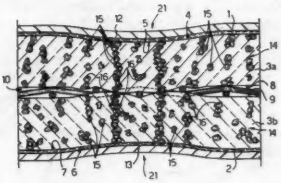
said first and second input connection elements being mounted on said first sidewall of the case whereas said first and scond output connection elements are mounted on the second sidewall, and said first and second switch devices form with the input and output connection elements which are associated therewith as well as with the corresponding conductor means, first and second through current lines, which do not cross inside the case and are directed transversely with respect to said sidewalls.

4,876,419

TWO-DIMENSIONAL ELECTRIC CONDUCTOR DESIGNED TO FUNCTION AS AN ELECTRIC SWITCH

Paolo Lodini, Turin, Italy, assignor to Leda Logarithmic Electrical Devices for Automation S.r.l., Turin, Italy

Continuation-in-part of Ser. No. 145,612, Jan. 19, 1988. This application Jun. 2, 1988, Ser. No. 201,598
Claims priority, application Italy, Jun. 2, 1987, 67473 A/87
Int. Cl.[4] H01H *3/14*
U.S. Cl. 200—86 R **7 Claims**



1. A two-dimensional electric conductor comprising a first and a second electric conducting element, each in the shape of at least a portion of a flat plate, at least one resilient electric conducting element in the shape of a flat plate and arranged in stacked relationship with said first and second conducting elements, and a spacer element formed from electrically-insulating material and also arranged in stacked relationship with said conducting elements, said spacer element being faced to a surface of said at least one resilient conducting element so as to partially shield said surface; the structure of the material from which said at least one resilient electric conducting element is formed comprising a supporting matrix formed from flexible, electrically-insulating material and particles of electrically-conductive material scattered in a random, substantially uniform manner inside cells in said matrix; said cells communicating at least partially with one another and being at least partially larger in size than the respective particles of electrically-conductive material housed inside the same, so that said at least one resilient electric conducting element is able to selectively assume, in response to a localized pressure exerted on a portion of said conductor, a first, unwarped shape in which said surface of at least one said resilient conducting element is kept spaced apart from at least one of the other conducting elements of the conductor by said spacer element, and a second, warped shape in which said surface of at least one said resilient conducting element contacts, through said spacer element, at least one of the other conducting elements of the conductor, so as to complete an electrical circuit with said first and second conductors.

4,876,420

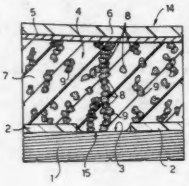
CONTINUOUS FLEXIBLE ELECTRIC CONDUCTOR CAPABLE OF FUNCTIONING AS AN ELECTRIC SWITCH

Paolo Lodini, Turin, Italy, assignor to LEDA Logarithmic Electrical Devices for Automation S.r.l., Turin, Italy

Filed Jun. 2, 1988, Ser. No. 201,489
Claims priority, application Italy, Jun. 2, 1987, 472 A/87
Int. Cl.[4] H01H *3/14*
U.S. Cl. 200—86 R **4 Claims**

1. A continuous, flexible electric conductor, characterised

by the fact that it comprises a first elongated electric conducting element; a spacer element formed from insulating material and placed over the surface of the said first conducting element, so as to shield all but given portions of the said surface; a second tubular electric conducting element placed over the outside of the said spacer element; a third tubular electric conducting element placed over the outside of the said second element; and a tubular insulating sheath placed over the outside of the said third conducting element; the structure of the said second conducting element comprising a supporting matrix formed from flexible electrically-insulating material and particles of electrically-conductive material scattered in random, substantially uniform manner inside cells on the said matrix; said cells communicating at least partially with one another, and being at least partially larger in size than the respective particles of said electrically-conductive material housed inside the same.

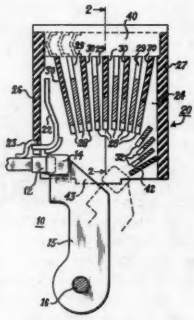


4,876,421

ASBESTOS-FREE ARC-CONFINING INSULATING STRUCTURE

Richard Miller, Devon, Pa., and John E. Zlupko, Marlton, N.J., assignors to General Electric Company, King of Prussia, Pa.

Filed Jul. 19, 1988, Ser. No. 221,093
Int. Cl.[4] H01H *33/08*
U.S. Cl. 200—144 C **12 Claims**



1. Arc-confining structure for an electric circuit interrupter comprising a portion with a surface that is exposed to an electric arc, said portion being constructed of an electric insulating material that is the thermosetting reaction product of the constituents of a mixture consisting essentially of the following constituents in the following percentages by weight of the mixture:

(a) 25 to 55 percent granular high-forsterite olivine, (b) 20 to 50 percent of a second granular constituent consisting essentially of silica sand, and (c) 15 to 28 percent phosphoric acid;

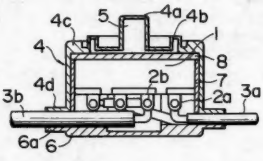
which mixture, after mixing of its constituents, is molded under heat and pressure to form a partially-cured molded piece, which piece at least in part serves as said portion of the circuit interrupter; said piece, after molding, being baked to substantially complete curing thereof; and said piece having a surface region that provides the arc-exposed surface of said circuit interrupter portion, said surface region having a zone that is flame treated at a sufficiently high temperature to convert the material of said zone to a surface glaze.

4,876,422

WATERPROOF SWITCH

Nobuyoshi Kanezawa, Kashiwa, Japan, assignor to Uchiya Termostat Co., Misato, Japan

Filed Apr. 26, 1988, Ser. No. 186,133
Claims priority, application Japan, Jan. 25, 1988, 63-7915[U]
Int. Cl.[4] H01H *9/04*
U.S. Cl. 200—302.1 **1 Claim**



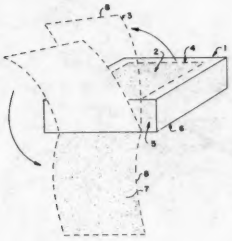
1. A waterproof switch including a switch mechanism having an operation portion, a plurality of leads connected to said switch mechanism, a waterproof housing having an external shape substantially corresponding to that of the switch mechanism, characterized in that said waterproof housing is composed of deformable material and comprises a first housing member and a second housing member, and each of said leads is enclosed in a sheath made of the same deformable material as said housing, said leads having essentially circular outer peripheries, said first housing member comprising a first part having an external shape substantially corresponding to that of said operation portion of said switch mechanism and a second part with grooves having a cross section substantially corresponding to a semi-circle of said essentially circular outer periphery of said leads, said second housing member having a grooved part with grooves having a cross section substantially corresponding to the rest of the semi-circle of said essentially circular outer periphery of the leads, said leads being inserted between said first and second housing members and unified in watertight relationship with heat or adhesion, and the operation portion of the switch mechanism being constructed and arranged to be handled from outside of said first part of the first housing member, a holding member, the operation portion of the switch mechanism penetrating the holding member, said holding member being disposed between said first housing member, said switch mechanism and said first housing member, said holding member including a frame portion and two deformable wave-formed portions having convex parts, concave parts and ends, said holding member being fixed to the frame portion at the ends of said deformable wave-formed portions, the latter being constructed and arranged in parallel and opposed relation to each other with their convex parts and concave parts of each said wave-formed portion facing corresponding convex parts and concave parts of said other of said wave-formed portions to form at least one pair of adjacent wide holes and a narrow path interconnecting said adjacent wide holes of said pair, said wide holes and said narrow path extending longitudinally between said wave-formed portions, the operation portion of the switch mechanism being inserted into one of said wide holes, said narrow path being narrower than said operation portion of the switch mechanism, said deformable portions deforming when said operation portion passes from one of said wide holes to said adjacent wide hole through said narrow path.

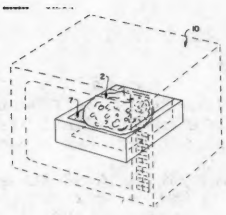
4,876,423

LOCALIZED MICROWAVE RADIATION HEATING

Laurence E. Tighe, Milford, and Tim Parker, Shrewsbury, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 194,260, May 16, 1988. This application Jan. 31, 1989, Ser. No. 304,734
Int. Cl.[4] H05B 6/64
U.S. Cl. 219—10.55 E 20 Claims





1. A microwave susceptor medium which can be coated or selectively printed on a substrate for controlled conversion of microwave radiation to heat without causing arcing during use comprising:

a fluid medium comprising a heat resistant polymeric binder and a filler comprising metallic and semiconductor substances dispersed in said fluid medium;

wherein said metallic and semiconductor substances are in particulate form, said susceptor having the property that it is heated to a temperature of at least 375° F. within about 4 minutes when exposed to microwave radiation at 700 watts power output.

4,876,424

BARRIER WITH A VENTING SCHEME FOR A CIRCUIT BREAKER

David A. Leone; Clifford A. Buxton, both of Lawrenceville, and W. Dale Robbins, Snellville, all of Ga., assignors to Siemens Energy & Automation, Inc., Alpharetta, Ga.

Filed Sep. 19, 1988, Ser. No. 246,484
Int. Cl.[4] H01H 9/30
U.S. Cl. 200—306 7 Claims

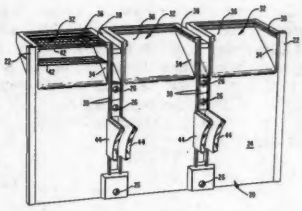
1. A circuit breaker comprising:

a housing including a first molded portion and a second molded portion, wherein the portions define a seam when joined; and

a barrier support within the housing between the portions at the seam,

the barrier and the first molded portion being adapted to enclose a means for contact opening and closing such that the means is substantially isolated from the contacts,

the barrier and the second molded portion being adapted to enclose a first contact and a second contact, the first contact being coupled to the means for contact opening and closing,



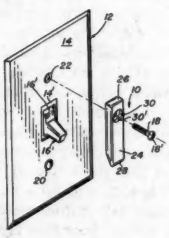
the barrier being formed integrally with a means for facilitating gas venting from within the housing.

4,876,425

LIGHT SWITCH AND OUTLET GUARD

Robert Woskow, 16801 Severo Pl., Encino, Calif. 91436

Filed Jun. 8, 1988, Ser. No. 204,217
Int. Cl.[4] H01H 3/20
U.S. Cl. 200—43.16 12 Claims



1. A guard for a wall-mounted light switch, which guard prevents access in one state thereof and allows access in another state thereof, comprising:

a main elongated portion having a first end portion and a second end portion, said first end portion having a through-opening formed therein;

said main elongated portion having a front surface face facing forward an interior of a room when said main elongated portion is connected to a wall plate of a light switch, and a rear surface face facing toward the wall when the main elongated portion is connected to the wall plate;

said second end portion defining an end-edge surface, whereby a mounting screw of a light switch mounts the main elongated portion to the wall plate of the light switch via said through-opening, said main elongated portion being pivotal about the mounting screw in order to be positionable in an operated, protective state thereof and a non-operated state thereof;

said main elongated portion further comprising a rearwardly projecting bead in direct alignment with said through-opening, said bead projecting from said rear surface face of said main elongated portion, whereby said bead may project into a mounting hole of the wall plate of the light switch, the mounting screw passing through said through-opening and said bead, said bead adding structural integrity to said main elongated portion and providing a seat during the pivoting thereof.

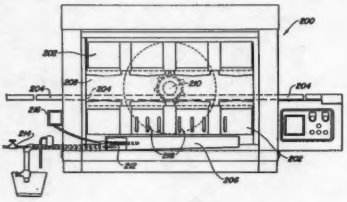
4,876,426
METHOD AND APPARATUS FOR WATER VAPOR CONTROL IN CONVECTION OVENS

Donald P. Smith, 2051 Valley View La., Dallas, Tex. 75234

Continuation of Ser. No. 29,323, Mar. 23, 1987, abandoned, which is a continuation of Ser. No. 689,654, Jan. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 407,943, Aug. 13, 1982, Pat. No. 4,492,839. This application Sep. 29, 1988, Ser. No. 253,314

Int. Cl.[4] H05B *6/78*

U.S. Cl. 219—10.55 A **21 Claims**



1. A method for controlling the water vapor content of recirculating air in a conveyorized convection oven for food products, said method comprising the steps of: controlling the temperature of said recirculating air at or above the desired temperature for food products exiting said oven; forming first jets of said recirculating air; directing said first jets at the surface of liquid in a reservoir maintained at a temperature below the temperature of said recirculating air, but above the temperature of food products entering said oven, to maintain the water vapor content below the saturation point of the recirculating air; forming second jets of recirculating air; and directing said second jets toward the surface of a food product moved by a conveyor, such that moisture carried by said second jets condenses onto the surface of a food product to provide rapid initial heating and such that the second jets controllably evaporate moisture from the surface of the food product and remove a moist boundary layer of air after the temperature of the food product increases to accelerate the rate of heat transfer between the recirculating air and the food product while preventing excessive drying of the food product.

4,876,427
LOCKING, DOUBLE-LAYERED MICROWAVE PACKAGE

Duane R. Mode, Bloomington, Minn., assignor to Waldorf Corporation, St. Paul, Minn.

Filed Mar. 25, 1988, Ser. No. 173,308

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 E **12 Claims**

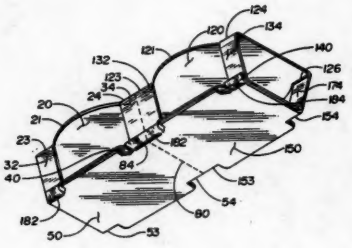
1. A package for holding and microwave cooking of food comprising two or more food holding units, each having the shape of a generally rectangular box with opposed, open ends and comprising:

(a) a first panel having a microwave absorbing heating surface facing the interior of said package;

(b) a second panel located opposite, spaced from and substantially parallel to said first panel and having a microwave absorbing heating surface facing the interior of said package; and

(c) a pair of substantially parallel side wall panels approximately equal height connecting said first panel and said second panel, each said side wall panel having an opening between its ends,

wherein each food holding unit has the same orientation as the others and is joined to at least one adjacent food holding unit at a weakened separation line that encircles the package in a plane substantially perpendicular to said first and second panels.



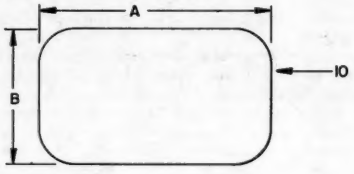
4,876,428
TRAY OR PAN FOR BAKING BATTER-BASED FOOD PRODUCTS IN MICROWAVE OVENS

Robert J. Petcavich, 4816 Marborough St., San Diego, Calif. 92116

Division of Ser. No. 89,508, Aug. 26, 1987. This application Nov. 15, 1988, Ser. No. 271,537

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 E **7 Claims**



1. In combination:

a microwave transparent open top pan having bottom and side walls substantially free of sharp corners;

a non-frozen, unbaked batter of batter-based food product in said pan;

a microwave oven within which the batter containing pan is supported for baking of said batter,

said microwave oven having an interior bottom wall supporting the batter containing pan and klystron for applying microwave energy to the batter in said pan at frequency having a wavelength in inches equal to λ;

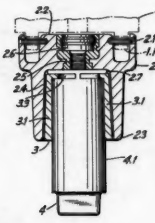
said bottom and side walls of said pan confining the batter in said pan within predetermined length, width and depth demensions, each of which dimensions is a multiple of a quarter wavelength $\lambda/4$ of the applied microwave energy; and

microwave transparent thermal spacer means between the bottom wall of said oven and the bottom of said pan for spacing the batter in the pan from the interior wall of the oven.

4,876,429
DEVICE FOR RETAINING TOOLS OR WORKPIECES HAVING A CYLINDRICAL SHAFT

René Büchler, Oberburen, Switzerland, assignor to Buchler B-Set AG, Flawil, Switzerland

Filed Feb. 16, 1988, Ser. No. 156,497
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1987, 3706123
Int. Cl.[4] B23K 1/12
U.S. Cl. 219—69.15 14 Claims

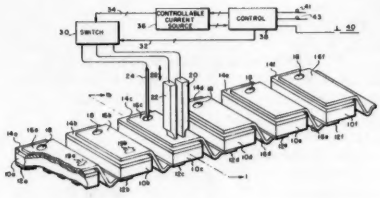


1. A coupling device for connecting a shaft of one member, particularly of a tool or a workpiece, to another member, particularly a machine tool of a die sinking erosion machine, the coupling device comprising a first coupling member receiving said shaft and a second coupling member which is anchored to said another member, said second coupling member including a conical recess which converges in a direction from a mouth thereof toward a coupling face between said first and second coupling member, said first coupling member including a taper sleeve subdivided along a periphery thereof into at least two portions engaging in assembly said shaft, said taper sleeve having an outer conical surface adapted to the conical recess of said second coupling member and an interior adapted to an outline of said shaft whereby when said taper sleeve is pressed into said second coupling member, said outer conical surface cooperates with said recess to retain said shaft in the coupling device.

4,876,430
PREWELD TEST METHOD

Roman Herschitz; Alexander Bogorad, both of Plainsboro, and Robert N. Harhigh, Trenton, all of N.J., assignors to General Electric Company, East Windsor, N.J.

Filed Jul. 25, 1988, Ser. No. 223,497
Int. Cl.[4] B23K 11/24
U.S. Cl. 219—110 16 Claims

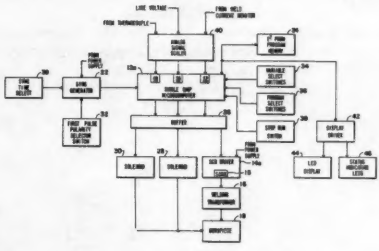


1. A method for welding together two sheets of electrically conductive material, comprising the steps of:
placing a first side of a first sheet of electrically conductive material in contact with a first side of a second sheet of electrically conductive material in a region to be welded;
applying first and second electrodes to a second side of said first sheet straddling said region to be welded;
applying a third electrode to said second sheet adjacent said region to be welded;
measuring the electrical resistance between at least one of said first and second electrodes and said third electrode;
comparing said electrical resistance with a predetermined value;
if said electrical resistance is below said predetermined value, applying electrical welding energy between said first and second electrodes;
if said electrical resistance exceeds said predetermined value, cleaning said first and second electrical sheets about said region to be welded and repeating said sheet placing, electrode applying, measuring, comparing and applying steps.

4,876,431
MICROPROCESSOR WELDER CONTROLLER

Douglas J. Livingston, Wilmot Flat, N.H., assignor to Black & Webster, Inc., Waltham, Mass.

Filed May 23, 1988, Ser. No. 197,158
Int. Cl.[4] B23K 11/24
U.S. Cl. 219—110 33 Claims

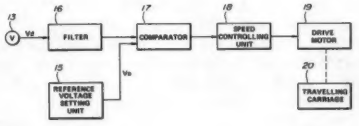


1. A microprocessor welding system controller for controlling the welding of a workpiece comprising: p1 switching means for selectively applying power to welding transformer; and
a single chip microcomputer means for controlling the power delivered to said welding transformer by said switching means to set the power level of said welding transformer, said single chip microcomputer including:
means for setting the time to reach said power level;
means for setting the time said power level is maintained;
means for setting the time to decrease the power level of said welding transformer to zero; and
means for controlling the polarity of the first half cycle of the power to said welding transformer.

4,876,432
METHOD FOR CONTROLLING A PENETRATION BEAD

Yuji Sugitani; Yoshikazu Sato, and Yasuhiko Nishi, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Jun. 27, 1988, Ser. No. 211,963
Claims priority, application Japan, Jul. 10, 1987, 62-171194
Int. Cl.[4] B23K 9/12
U.S. Cl. 219—124.32 15 Claims



1. A method for controlling a penetration bead, in an automatic one-side gas shielded arc welding process wherein a

backing material is adhered to the back of a pair of work pieces along a weld line and the welding is effected automatically from the surface side of the work pieces, comprising:

putting an electrically conductive material on a surface of said backing material for forming a penetration bead in a longitudinal direction of said weld line, said electrically conductive material being a material selected from the group consisting of a metallic foil tape, a metallic net and a metallic wire;

detecting a voltage between the work pieces and said electrically conductive material during the welding; and

controlling the detected voltage so as to have a voltage equal to a predetermined reference voltage value.

4,876,433

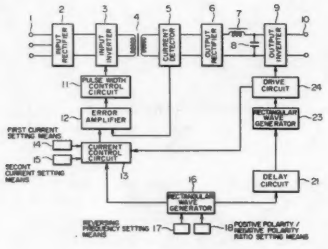
INVERTER CONTROLLED-TYPE POWER SOURCE FOR ARC WELDING

Takayuki Kashima, Fujisawa; Akira Sakabe, Urawa, and Yoshifumi Yamanaka, Hokkaido, all of Japan, assignors to Hitachi Seiko, Ltd., Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,140

Int. Cl.[4] B23K *9/09*

U.S. Cl. 219—130.51 **7 Claims**



3. A power source for arc welding comprising:

first frequency converting means including a first rectifier for converting a first low-frequency AC voltage to a DC voltage, and a first inverter for converting said DC voltage to a second AC voltage;

a transformer for converting said second AC voltage to a third AC voltage suitable for welding:

second frequency converting means including a second rectifier for converting said third AC voltage to a DC voltage, and a second inverter for converting said rectified DC voltage to a controlled AC voltage;

means for applying said controlled AC voltage generated from said second frequency converting means to materials to be welded together to apply a welding current thereto;

means for selectively setting the magnitude of said welding current to either of a first set value suitable for the welding of said materials and a second set value suitable for positively reversing the polarity of said welding current;

means for controlling the operation of said welding current setting means to select said second set value during the polarity reversal of said welding current; and

means for inhibiting, at the time of reversing the polarity of the output current from said second inverter, the polarity reversal of said output current when said output current is in excess of a predetermined upper limit value.

4,876,434

CURING COATINGS OF A MOISTURE-CURABLE COMPOSITION

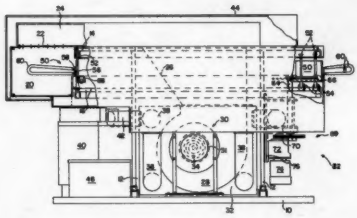
Raymond Hanson, Rearsby; Malcolm Tillyard, Leicester, and Christopher M. Allen, Loughborough, all of United Kingdom, assignors to British United Shoe Machinery Limited, Leicester, England

Division of Ser. No. 859,987, Apr. 9, 1986, Pat. No. 4,780,335. This application Jul. 15, 1988, Ser. No. 219,451

Claims priority, application United Kingdom, Sep. 4, 1984, 8422334

Int. Cl.[4] F27B *9/10, 9/18*

U.S. Cl. 219—215 **10 Claims**



1. Apparatus for curing a coating of a moisture-curable composition applied to the bottoms of shoes comprising:

a chamber;

a substantially enclosed plenum overlying said chamber and having a bottom wall common with the top wall of said chamber;

conveyor means by which shoes are conveyed, bottom uppermost through said chamber;

means for supplying a continuous stream of air to said plenum, said bottom wall having an array of apertures extending over substantially the whole length of said chamber and opening into the top of said chamber whereby air supplied therethrough directly impinges on the bottom of a shoe being conveyed by said conveyor means through said chamber;

said apertures further comprising means for heating the air; and

means for supplying a controlled amount of steam to the air, prior to entry of the air into said plenum said conveyor means comprising an endless track and a plurality of carriages, movable along said track, for supporting shoes bottom uppermost, each said carriage having a pair of projecting support means between which the crown of a shoe last can be received for supporting the shoe bottom uppermost, said support means being mounted on said carriage for height-wise adjustment thereon.

4,876,435

SANITARY HAND DRYER

Junior F. Hawkins, 3120 W. 16th, Wichita, Kans. 67203

Filed Jan. 13, 1988, Ser. No. 143,332

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—364 **5 Claims**

1. A sanitary hand dryer comprising:

a housing having a box-like structure defined by a top, a pair of sides secured to the top, and an upright face secured normally to the top and to the pair of sides, said upright face having a structure defining a longitudinal opening wherethrough warm air can pass;

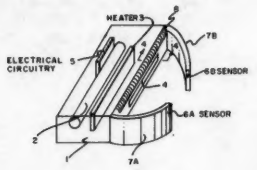
a blower means disposed in said housing for blowing air;

a heating coil means disposed in said housing in proximity to said blower means;

an electronic circuitry means electrically connected to said heating coil means and to said blower means in order to energize said blower means and said housing coil means

such that the blower means blows air over the heating coil means to heat the same and discharge warm air through said longitudinal opening, said electronic circuitry means comprises a light sensor means;

a top vane air deflector means secured to said housing at the securing point where said top secures normally to said face and extending over said longitudinal opening to deflect warm air passing through said longitudinal opening; and



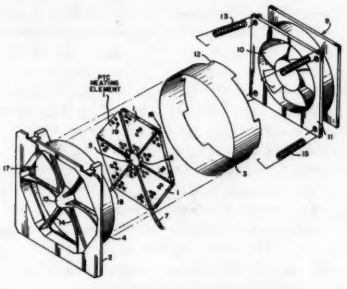
a pair of opposed side vane air deflector means secured to said housing at the securing point where said upright front secures normally to said pair of sides for deflecting warm air, and each of said opposed side vane air deflector means has an arcuate shape and terminates in an end and said light sensor means comprises a first light sensor means mounted on the end of one of said side vane air deflector means, and a second light sensor means mounted on the end of the other side vane air deflector means.

4,876,436

PTC AIR HEATER ENPLOYING TRIANGULAR PTC HEATING ELEMENTS

Mason G. Ide, Gorham, Me.; Noel L. W. Lawrence, London, Canada, and Lee Prager, Raymond, Me., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jul. 27, 1988, Ser. No. 224,638
Int. Cl.[4] H05B *1/02, 3/06;* F24H *3/04*
U.S. Cl. 219—370 **7 Claims**



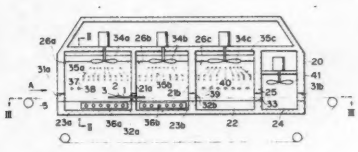
1. An air heater comprising: six triangular PTC heating elements co-planarly disposed within a circular shroud; an apex of each triangular PTC heating element being adjacent a common central point; the sides of the six triangular PTC heating elements, which are opposite the apexes adjacent a common central point, forming a hexagon; the area occupied by the six triangular PTC heating elements being greater than 78% of the cross sectional area of the circular shroud; each PTC element having a multiplicity of holes therethrough; means for forcing air within the shroud through the holes in the PTC elements to be heated when the PTC elements are electrically energized; and means for electrically energizing the PTC elements.

4,876,437

SOLDERING APPARATUS

Kenshi Kondo, Tokyo, Japan, assignor to Nihon Den-Netsu Keiki Co., Ltd., Tokyo, Japan

Filed Jul. 14, 1988, Ser. No. 218,872
Int. Cl.[4] B23K *3/00*
U.S. Cl. 219—388 **6 Claims**



1. An apparatus for soldering printed circuit boards having elec ric parts temporarily mounted thereon with solder preforms, comprising:

an axially elongated housing member;

conveying means providing a path along which the printed circuit boards are conveyed through said housing member in the direction parallel to the axis of said housing member;

one or more transversely extending partition means provided within said housing member for partitioning the inside space thereof into axially aligned reflowing chamber and one or more preheated chambers, with said reflowing chamber being located downstream of said one or more preheating chambers with respect to the direction of the travel of said printed circuit boards through said housing member;

an aperture provided in each of said transversely extending partition means to permit the printed circuit boards to pass therethrough;

a pair of spaced apart vertical partitions extending axially within each of said preheating chambers and said reflowing chamber for partitioning same into two, outer, air flow channels and a center space;

upper and lower openings provided in each of said vertical partitions so that the air flow channels of each chamber are in fluid communication with the corresponding center space;

first heating means disposed in the center space of each of said preheating chambers and reflowing chamber for heating the air in said center space, so that the printed circuit boards are preheated with the heated air during their passage through said chamber;

second heating means disposed within said reflowing chamber for causing the solder preforms of the printed circuit boards to reflow during their passage through said reflowing chamber, said second heating means being one or more reflector type infrared radiation lamps;

fan means provided in the center space of each of said preheating chambers and reflowing chamber to cause the air in said chamber to circulate through said center space and said air flow channels; and

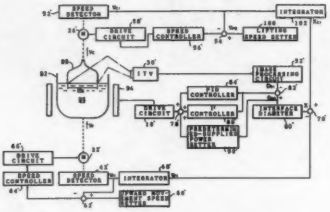
flow control plates provided in the center space of each of said preheating chambers and reflowing chamber and positioned between the fan and the path of travel of the printed circuit boards for controlling the flow of the circulating air through said center space so as to uniformly heat the printed circuit boards.

4,876,438

CONTROL OF THE POWER TO THE HEATER AND THE SPEED OF MOVEMENT OF A CRYSTAL ROD BY CONTROL OF THE CRYSTAL ROD DIAMETER

Masataka Watanabe, Nakakubiki; Nobuhiro Ohhara, and Kenichi Taguchi, both of Joetsu, all of Japan, assignors to Shin-Etu Handotai Co., Ltd., Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 203,441
Claims priority, application Japan, Jun. 5, 1987, 62-141019
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—497 30 Claims



1. A diameter controller for crystallization based on the FZ or CZ method, comprising:

setting means to output a predetermined value in response to a first detected value of a quantity relating to a crystal grown from a melt;

first control means for performing one PI control action in response to a difference between a second detected value of a quantity relating to a diameter of said crystal and a desired value of said second detected value;

second control means for outputting a value proportional to double time-integral of said difference in response to said difference;

superposition means for outputting a value of representing a linear combination of the output of said setting means, the output of said first control means and the output of said second control means;

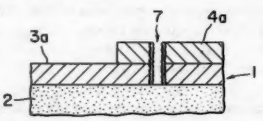
final control means for controlling, in response to the output from said superposition means, power supplied to a heating device for melting a raw material so as to limit said difference towards zero.

4,876,439

PTC DEVICES

Atsushi Nagahori, Ibaraki, Japan, assignor to Nippon Mektron, Ltd., Tokyo, Japan

Division of Ser. No. 19,159, Feb. 26, 1987, Pat. No. 4,769,901.
This application Jul. 18, 1988, Ser. No. 220,169
Claims priority, application Japan, Mar. 31, 1986, 61-73726
Int. Cl.[4] H05B *3/08*
U.S. Cl. 219—541 6 Claims



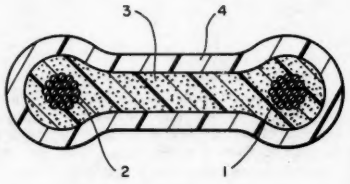
1. A PTC device comprising at least two electrode plates, a PTC composition disposed between and electrically connected to the electrode plates, and a lead plate joined to the surface of each of the electrode plates, wherein said PTC device has at least one through hole penetrating through at least one of said electrode plate and corresponding lead plate.

4,876,440

ELECTRICAL DEVICES COMPRISING CONDUCTIVE POLYMER COMPOSITIONS

Hundi P. Kamath, Foster City, and Jeffrey C. Leder, Redwood City, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 799,293, Nov. 20, 1985, abandoned, which is a continuation of Ser. No. 545,724, Oct. 26, 1983, abandoned, which is a continuation of Ser. No. 251,910, Mar. 27, 1979, Pat. No. 4,426,339, which is a continuation of Ser. No. 24,369, Mar. 27, 1979, abandoned, which is a continuation of Ser. No. 750,149, Dec. 13, 1976, abandoned. This application Feb. 7, 1989, Ser. No. 309,005
Int. Cl.[4] H05B *3/10*
U.S. Cl. 219—548 35 Claims



1. An electrical device which has improved resistance stability under service conditions, which comprises two elongate electrodes, each of said electrodes being surrounded by and being in direct physical and electrical contact with a melt-extruded, electrically conductive polymer composition which

(a) has a resistivity at 70° F. of less than 50,000 ohm.cm, and

(b) comprises an organic polymer having dispersed therein a finely divided conductive filler,

and in which device, when said electrodes are connected to a source of electrical power, current passes between the electrodes through the conductive polymer composition; wherein each of said electrodes has been surrounded and contacted by the conductive polymer composition by a process which comprises

(1) heating a thermoplastic electrically conductive polymer composition to a temperature above its melting point, said composition comprising an organic polymer having dispersed therein a finely divided conductive filler;

(2) heating each electrode, in the absence of the conductive polymer composition, to a temperature above the melting point of the conductive polymer composition; and

(3) melt-extruding the molten conductive polymer composition prepared in step (1) over and into direct physical and electrical contact with the electrodes which have been heated in step (2), while each of the electrodes is at a temperature above the melting point of the conductive polymer composition, thereby forming an elongate extrudate of the electrically conductive composition with the electrodes embedded therein and in direct physical contact with the conductive polymer composition;

said conductive polymer composition being such that if steps (1), (2) and (3) are carried out, and the extrudate is allowed to cool without taking any measures to reduce the resistivity of the extruded composition, the cooled composition has a resistivity at 70° F. of less than 50,000 ohm.cm;

whereby the contact resistance between the electrodes and the conductive polymer composition in contact therewith is reduced.

4,876,441
CARD-LIKE ELECTRONIC APPARATUS

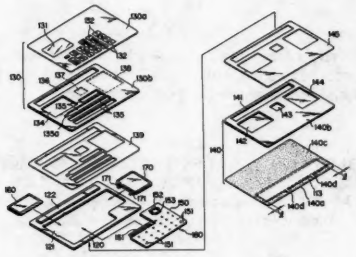
Kazuya Hara; Takanori Inoue, both of Tokyo, and Hiroyasu Bito, Oome, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 711,422, Mar. 13, 1985. This application Sep. 29, 1987, Ser. No. 102,575

Claims priority, application Japan, Mar. 27, 1984, 59-43975; Aug. 15, 1984, 59-124608; Oct. 3, 1986, 61-235745; Nov. 19, 1986, 61-176633[U]; Nov. 27, 1986, 61-181089[U]; Nov. 29, 1986, 61-182800[U]; Dec. 4, 1986, 61-186130[U]

Int. Cl.[4] G06K *19/02*

U.S. Cl. 235—488 **22 Claims**



1. A card-like electronic apparatus comprising:

electronic device means;

case means made of a press-treatable material having an accommodation section to accommodate said electronic device means and a projecting portion of a uniform thickness for formation of an embossment;

a cover, located on one surface of said case means in which said electronic device means is accommodated; and

supporting member means situated on the other surface of said case means and having a cutaway portion in which said projecting portion is fit.

4,876,442
LASER CONTROL CIRCUIT

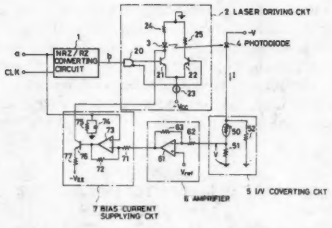
Masaya Fukushima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 264,570

Claims priority, application Japan, Oct. 30, 1987, 62-273585

Int. Cl.[4] G01J *1/32*

U.S. Cl. 250—205 **4 Claims**



1. A laser control circuit responsive to an electrical modulating signal, wherein part of the optical output power of a semiconductor laser is detected and converted into an electric signal for controlling a bias current to be supplied to said laser, said laser control circuit comprising:

laser driving means for intensity-modulating said laser in response to said electrical modulating signal;

a light receiving element for receiving part of the output light of said laser and outputting a current corresponding to the optical power of said output light received;

current/voltage converting means for converting said output current from said light receiving element into a voltage at a prescribed current/voltage converting efficiency A(T), said converting efficiency A(T) having a positive temperature coefficient with respect to the temperature in the vicinity of said laser; and

control means for so controlling said bias current so as to keep constant said voltage provided by said current/voltage converting means.

4,876,443
PHOTOCELL, HAVING INCLINED PLATE CATHODE

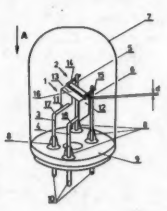
Josef Beucher, Hochstadt, Fed. Rep. of Germany, assignor to GTE Sylvania Licht GmbH, Erlangen, Fed. Rep. of Germany

Filed May 13, 1988, Ser. No. 193,962

Claims priority, application Fed. Rep. of Germany, May 13, 1987, 3715924

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—211 R **8 Claims**



1. A photocell, in particular for detecting U.V. radiation, comprising a plate cathode (1), an anode (2) and lead-in and lead-off lines (3, 4, 5, 6) respectively, which are sealed in a glass envelope, the plate cathode (1) consisting of a sheet metal strip (13) which, at its ends (20, 21), is connected to said lead-in lines (3, 4), while said anode (2) consists of a wire (16) which, at its ends (14, 15), is connected to the lead-off lines (5, 6) and which is arranged on the plate cathode side facing the radiation to be detected, substantially parallel to said plate cathode and spaced apart a distance (d) from the latter, characterized in that the plane of the sheet metal strip (13) constituting the cathode (1) is disposed at an angle of inclination with respect to the longitudinal axis (19, FIG. 3) of the glass envelope (7).

4,876,444
PROTECTION FROM EXTRANEOUS LIGHT FOR LIGHT GUIDED VEHICLE

Bruce F. Field, Minneapolis, Minn., assignor to Tennant Company, Minneapolis, Minn.

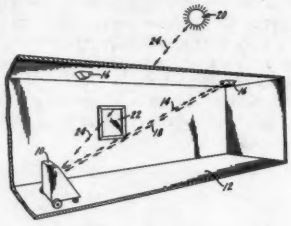
Filed Mar. 7, 1988, Ser. No. 164,880

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—214 AL **9 Claims**

1. A laser beam detecting device for use in conjunction with one or more retroreflective targets, comprising a transmitter for emitting a laser beam, scanning means for traversing said emitted laser beam through a scanning plane, a traversing said emitted laser beam through a scanning plane, a receiver for detecting a laser beam reflected from one of said targets and converting it to an output signal, a photodetector mounted adjacent the receiver such that extraneous light striking the receiver only from a direction parallel to said scanning plane will also strike the photodetector, the photodetector producing a signal indicating the amount of extraneous light striking

the device, and comparing means for comparing the photodetector signal to a predetermined threshold and generating an interrupt signal for overriding the output signal of the receiver when the threshold is exceeded.



4,876,445

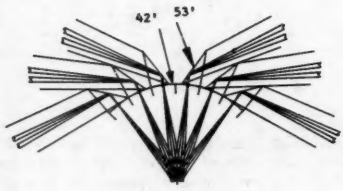
INTRUSION DETECTION DEVICE WITH EXTENDED FIELD OF VIEW

Richard L. McMaster, Pittsford, N.Y., assignor to Nvtek Security Products, Inc., Fairport, N.Y.

Filed May 16, 1988, Ser. No. 194,335

Int. Cl.[4] G01V *9/04*

U.S. Cl. 250—221 **8 Claims**



2. An intrusion detection device with an optically extended field of view, said device comprising:

radiation sensitive means;

a segmented lens system arranged to concentrate radiation onto the sensing means from each of a plurality of discrete fields of view extending over a predetermined arc; and

reflecting means within the field of view of each of a plurality of said lens segments for gathering radiation approaching said device from beyond said predetermined arc and for reflecting the gathered radiation onto said lens system at angles within the associated lens segment, the field of view of said reflecting means being greater than 180 degrees.

4,876,446

OPTICAL SENSOR WITH OPTICAL INTERCONNECTION BOARD

Yoshiaki Kambe; Yoshihiko Okuda; Atsuyuki Hirono; Akira Nagaoka, and Takayasu Ito, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

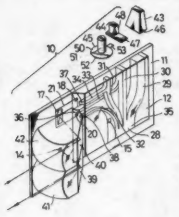
Filed Jan. 29, 1988, Ser. No. 150,385

Claims priority, application Japan, Feb. 6, 1987, 62-26755; Feb. 24, 1987, 62-41006; Jul. 15, 1987, 62-176256

Int. Cl.[4] G01V *9/04*; H01J *5/16*

U.S. Cl. 250—221 **18 Claims**

1. An optical sensor comprising means for projecting light to a detection area, means for receiving light reflected from an object present in said detection area, a sensor function setting means capable of energizing said light projecting means, a signal processing means for processing output signals from said light receiving means to discriminate the presence of said object and for providing an object detection signal, and an optical interconnection board including optical wave guides respectively interconnecting said light projecting means, said light receiving means, said sensor function setting means and said signal processing means with one another.



4,876,447

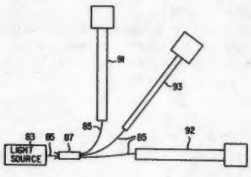
FIBER OPTIC ACCELEROMETER USING CLOSED FEEDBACK RELATION TO VARY PATHLENGTH

Kevin M. Killian, Hackensack, N.J., assignor to Allied-Signal Inc., Morris County, Morris Township, N.J.

Filed Aug. 6, 1987, Ser. No. 82,258

Int. Cl.[4] H01J *5/16*; G01D *5/34*

U.S. Cl. 250—227 **11 Claims**



1. Accelerometer in which a proof mass is suspended by a cantilever beam, and deflection of the beam is proportional to acceleration, characterized by:

(a) two light paths, the light paths being rendered unequal in length by the deflection of the beam, the light paths merging at least one end;

(b) a light source connected to the light paths;

(c) photodetection means responsive to light in the merged light paths and sensitive to changes in the character of light as a result of said unequal pathlengths; and

(d) a feedback loop including first means in one of the light paths and second means connected to the first means and to the photodetection means, said first means varying the length of the one light path to equalize the length of the two light paths which have been rendered unequal by the acceleration, said second means applying a signal to the first means commensurate with said acceleration.

4,876,448

OPTICAL SYSTEM FOR MOTION COMPENSATION OF LINE SCANNERS

Horst Laucht, Bruckmühl, and Jürgen Euskirchen, Waldhofen, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 879,125, May 21, 1986, abandoned. This application Oct. 17, 1988, Ser. No. 259,479

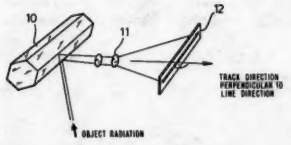
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434794

Int. Cl.[4] G02B *26/10*

U.S. Cl. 250—234 **3 Claims**

1. An optical system for motion compensation of a line

scanner to improve resolution in at least one spectral channel, the system having a motion of its own or being arranged on a moving observation platform, the system comprising optical means for directing light along an optical path from a radiation source to at least one detector and further comprising a multi-



faced prism, said prism disposed in the optical path and rotating about a central axis thereof at a predetermined rotational speed in a direction opposed to the direction of the platform or the system motion for increasing the integration time for imaging the radiation source on the detector.

4,876,449

RESERVOIR EVALUATION USING PARTITIONING TRACER

Burton M. Casad, and Preston L. Gant, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed May 12, 1988, Ser. No. 193,471
Int. Cl.[4] G01V 5/00
U.S. Cl. 250—259 10 Claims

1. A method of obtaining information about a watered-out oil reservoir comprising:

(a) injecting into a first well (1) a partitioning radioactive tracer material having a first gamma ray emission spectrum, and (2) a water-soluble non-partitioning radioactive tracer material having a different gamma ray emission spectrum; and

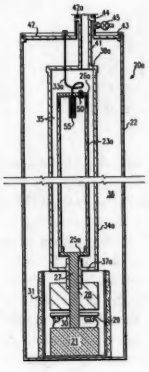
(b) periodically logging a second well spaced from said injection well to detect arrival of and amount of said tracer materials.

4,876,450

CRYOSONDE FOR WELL LOGGING TOOL

Melvin G. Montgomery, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 26, 1988, Ser. No. 224,511
Int. Cl.[4] G01V 5/00
U.S. Cl. 250—261 6 Claims



1. A cryosonde comprising:

a housing;

a germanium crystal in said housing; and

a means for cooling said crystal comprising:

a refrigerant chamber in said housing in thermal communication with said crystal;

means to fill said chamber with a refrigerant; and

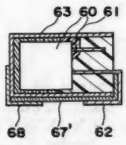
rupture means in communication with the interior of said chamber adapted to rupture at a pressure less than the pressure required to rupture said chamber.

4,876,451

ALUMINUM SOLID ELECTROLYTIC CAPACITOR AND MANUFACTURING METHOD THEREOF

Hironosuke Ikeda, Hirakata; Tadashi Ezaki; Kakushiyou Yoshida, both of Saga; Rikizou Yamaguchi, Taku, and Kazuhiro Suenaga, Saga, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi and Saga Sanyo Industry Co., Ltd., Saga, both of, Japan

Filed Aug. 4, 1988, Ser. No. 228,098
Claims priority, application Japan, Aug. 5, 1987, 62-196130; Aug. 8, 1987, 62-198938; Nov. 30, 1987, 62-302797; Dec. 3, 1987, 62-184767[U]; Dec. 14, 1987, 62-315755; Dec. 16, 1987, 62-319322
Int. Cl.[4] H01G 9/06
U.S. Cl. 361—540 31 Claims



1. An aluminum solid electrolytic capacitor, comprising:

an anode aluminum foil having an oxide film formed on a surface thereof, a cathode aluminum foil and carbonized separators for separating said anode and cathode aluminum foils, the two foils and the separators being wound to form a capacitor element, the distance between the two foils in the capacitor element to be determined by the thickness of separator being kept at a value between ten to sixty micrometers, solid manganese nitrate electrolyte being formed between the two foils by the thermal decomposition of electrolytic solution impregnated in the capacitor element.

4,876,452

RADIATION IMAGE READ-OUT APPARATUS

Kazuo Horikawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 3, 1984, Ser. No. 677,446
Claims priority, application Japan, Dec. 5, 1983, 58-229570
Int. Cl.[4] G03C 5/16
U.S. Cl. 250—327.2 7 Claims

1. A radiation image read-out apparatus comprising:

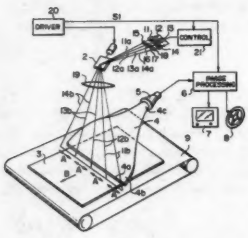
(i) a plurality of stimulating ray sources,

(ii) a single light deflecting means for receiving beams of stimulating rays emitted by said stimulating ray sources and for making said beams of stimulating rays impinge on different portions of a stimulable phosphor sheet carrying a radiation image stored therein so that said different portions of said stimulable phosphor sheet are scanned by said beams of stimulating rays in a main scanning direction, each of said beams traversing a respective one of said different portions,

(iii) a stimulating ray source drive control means for pulsewise turning on said stimulating ray sources at timings deviated from each other,

(iv) a sub-scanning means for moving said stimulable phosphor sheet with respect to said beams of stimulating rays in a sub-scanning direction approximately normal to the main scanning direction,

(v) a single light guide member having a light input face



extending in the main scanning direction close to a scanning line in the main scanning direction, said light guide member guiding light entering from said light input face up to a light output face thereof, and

(vi) a photodetector connected with said light output face of said light guide member.

4,876,453

METHOD AND APPARATUS FOR CALIBRATING AN IMAGING SENSOR

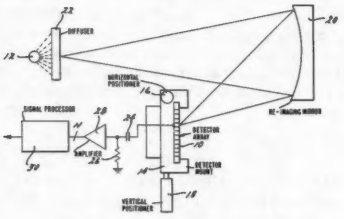
Michael P. Wirick, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 19, 1986, Ser. No. 830,788

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[4] H01L *31/00*

U.S. Cl. 250—332 **24 Claims**



1. An imaging sensor for scanning a thermal image comprising:

a first set of elemental detectors operable to receive a portion of said thermal image during a first portion of a calibration cycle;

a second set of elemental detectors operable to receive said portion of said thermal image during a second portion of said calibration cycle; and

means for calibrating said first and second sets of elemental detectors by directly comparing the outputs of said first set of elemental detectors during said first portion of said calibration cycle with the outputs of said second set of elemental detectors during said second portion of said calibration cycle so that the relative responses between said first and second plurality of elemental detectors may be determined.

4,876,454

RADIATION DETECTOR

Peter H. Burgess, Oxfordshire, England, assignor to National Radiological Protection Board, Oxfordshire, England

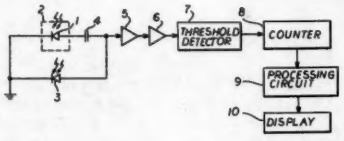
PCT No. PCT/GB87/00148, § 371 Date Oct. 15, 1987, § 102(e) Date Oct. 15, 1987, PCT Pub. No. WO87/05403, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 3, 1987, Ser. No. 138,372

Claims priority, application United Kingdom, Mar. 5, 1986, 8605394

Int. Cl.[4] G01T *1/02*; H01L *31/00*

U.S. Cl. 250—370.14 **9 Claims**



1. A radiation detector for generating pulses in response to incident radiation characterised by two PIN photodiodes (1,3) each disposed to operate in a self biasing mode, one of the diodes having an effective sensitive area substantially larger than that of the other and the larger area diode being provided with means (2) for attenuating radiation incident thereon, and means (5) for combining the output of each diode.

4,876,455

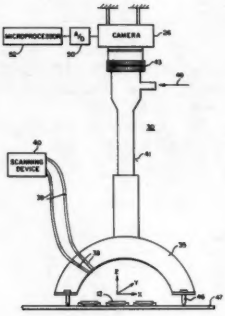
FIBER OPTIC SOLDER JOINT INSPECTION SYSTEM

Arthur C. Sanderson, Williamstown, Mass.; Lee E. Weiss, and Shree K. Nayar, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 25, 1988, Ser. No. 160,562

Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—560 **17 Claims**



1. A method for determining the shape of an object having a specular surface comprising the steps of:

(a) projecting sequentially toward the object the light from each of a plurality of point light sources which are arranged in a fixed configuration about a common site at which the object is placed for inspection;

(b) viewing the object at the common site to detect light patterns caused by the reflections of light of each point light source from the object surface;

(c) interpreting the light patterns to determine the surface orientation of points on the object surface; and

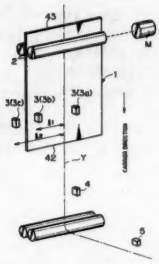
(d) reconstructing the object surface profile using the surface orientations of points on the object.

4,876,456

METHOD OF AND APPARATUS FOR DETECTING PRESENCE OR ABSENCE OF PHOTOSENSITIVE OBJECT AT A PRESCRIBED POSITION

Koichi Isono, and Ikuo Sho, both of Hikone, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Dec. 21, 1987, Ser. No. 136,488
Claims priority, application Japan, Dec. 19, 1986, 61-304735
Int. Cl.[4] G03D *13/00*
U.S. Cl. 250—561 **9 Claims**



1. An apparatus for optically detecting a photosensitive object having photosensitive material carried along a prescribed path at a prescribed position along said path, said apparatus comprising:

light emitting means facing said prescribed position;

first power supply means for supplying pulsed power to said light emitting means thereby to activate said light emitting means to emit pulsed light, an activation time and an activation interval of said pulsed power being determined to satisfy such a condition that an accumulated exposure value in each portion on said photosensitive object is less than a critical exposure value of said photosensitive material depending on a photosensitive character of said photosensitive material when said pulsed light is applied to said photosensitive object being moved:

second power supply means for supplying continuous power to said light emitting means thereby to activate said light emitting means to emit continuous light;

selection means for selectively enabling one of said first and second power supply means in response to an externally supplied selection signal thereby to activate said light emitting means selectively to emit one of said pulsed light and said continuous light; and

light receiving means facing said prescribed position for receiving light emitted from said light emitting means thereby to generate a photosensitive object detection signal indicating whether or not said photosensitive object is present at said prescribed position.

4,876,457

METHOD AND APPARATUS FOR DIFFERENTIATING A PLANAR TEXTURED SURFACE FROM A SURROUNDING BACKGROUND

Chinmoy B. Bose, Green Brook, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,709
Int. Cl.[4] G01N *21/88*
U.S. Cl. 250—563 **13 Claims**

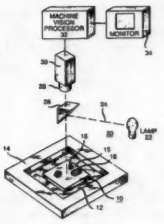
1. A method for differentiating between a textured, planar surface and a background region surrounding the surface comprising the steps of:

illuminating both the textured, planar surface and the surrounding background region by directing light thereat so the light strikes the surface substantially normal to the plane thereof;

capturing the image of the textured planar surface and the surrounding background region with an image-acquisition device which is positioned to sense the light reflected from the background region and the surface substantially normal to the plane of the surface thereof such that only the textured planar surface appears in focus within the captured image;

determining the intensity of each of a plurality of small areas (pixels) within the captured image;

determining the intensity gradient for each pixel;



creating a gradient image by assigning to each pixel within the captured image an intensity value according to its intensity gradient; and

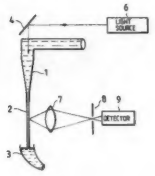
binarizing the gradient image by causing each pixel therein to appear bright or dark, depending on whether the intensity gradient established for each pixel is above or below a predetermined threshold, respectively, thereby eliminating the background region from the captured image.

4,876,458

APPARATUS FOR MEASURING PARTICLES IN LIQUID

Kazuo Takeda, Kokubunji; Yoshitoshi Ito, Ome; Noriaki Honma, and Chusuke Munakata, both of Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 250,615
Claims priority, application Japan, Oct. 2, 1987, 62-247927; Jul. 18, 1988, 63-177158
Int. Cl.[4] G01N *15/06*
U.S. Cl. 250—574 **7 Claims**



1. An apparatus for measuring particles in a liquid the apparatus comprising:

a sample liquid supply means for allowing the sample liquid to flow out from a nozzle into a gas in a stream;

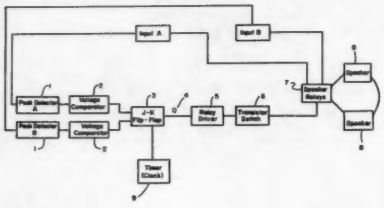
a light radiation means for radiating light into an sample liquid stream coaxially with the axis of the stream; and

a scattering light detection means for collecting rays of light scattered by particles contained in a sample liquid stream at a point outside and by the side of the sample liquid stream and then detecting the collected light rays.

4,876,459
TOGGLING SPEAKERSWITCH

Thomas P. Flock, Box 236, Rte. 2, Murphysboro, Ill. 62966

Filed Nov. 14, 1988, Ser. No. 270,769
Int. Cl.[4] H02J *1/00*
U.S. Cl. 307—11 8 Claims

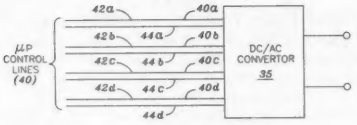


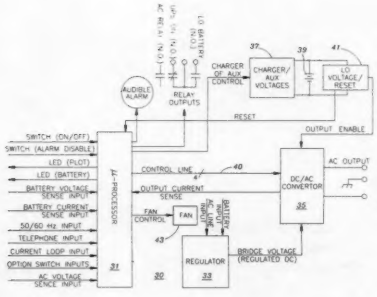
1. An electronic circuit for switching speakers, comprising:
(a) a first peak detector circuit connected to a first voltage comparator which sends a first signal to a J-K flip-flop;
(b) a second peak detector circuit connected to a second voltage comparator which sends a second signal to a J-K flip-flop;
(c) a timer circuit connected to said J-K flip-flop;
(d) a J-K flip-flop which toggles between said first and second signals and has an output Q;
(e) a relay driver which receives said output Q and switches between said first and second signals according to the output Q and which drives speaker relays and speakers.

4,876,460
UNINTERRUPTED POWER SUPPLY

Ronald W. Johnson, Laguna Hills, Calif., assignor to Intellipower, Inc., Laguna Hills, Calif.

Filed Mar. 27, 1989, Ser. No. 329,194
Int. Cl.[4] H02J *9/06;* H02M *5/45*
U.S. Cl. 307—64 18 Claims



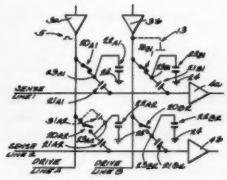


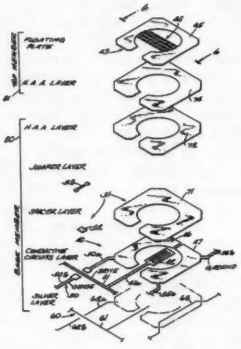
1. A continuous uninterrupted power supply (UPS) having microprocessor controlled switching circuitry, comprising:
a regulator circuit for receiving an AC input line signal and for generating a regulated DC signal therefrom;
a DC/AC converter connected to said regulator for receiving said regulated DC signal and generating an output AC signal therefrom; and
a microprocessor controller connected to said DC/AC converter for controlling the operation thereof, said microprocessor being connected to said DC/AC converter by a plurality of signal line pairs, each of said pairs including a control line and a return line, said control line and said return line being disposed in close proximity such that signals induced in said control line are also induced in said return line.

4,876,461
SELF-REFERENCING CAPACITIVE KEY CELL STRUCTURE AND SWITCHCORE MATRICES FORMED THEREFROM

Norman G. Gratke, Elm Grove, Wis., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Feb. 23, 1989, Ser. No. 314,721
Int. Cl.[4] H03K *17/975;* H01H *35/00*
U.S. Cl. 307—116 10 Claims





1. In a capacitive key cell of the type including a contact switch in series with a key cell capacitor for use in a matrix of similar capacitive key cells, the improvement wherein each key cell further includes an intracell coactive loading capacitor connected between a low impedance source of constant voltage and the junction of the contact switch with the key cell capacitor.

6. A membrane switchcore comprising:
a plurality of drive lines;
one or more sense lines;
a ground line;
a plurality of key cells, each key cell being connected to the ground line and to a unique combination of one drive line and one sense line, in which at least one sense line is connected to two or more of said plurality of key cells, and in which each key cell includes: a contact switch, with one end of the contact
switch being connected to one drive line, and the other

end of the contact switch being connected to a floating junction point, the contact switch having a high impedance open state and a low impedance closed state;

actuating means for changing the contact switch between the open and closed states;

a key cell capacitor, with one end of the key cell capacitor being connected to said at least one sense line, and the other end of the key cell capacitor being connected to the floating junction point; and

an intracell coactive loading capacitor connected between the floating junction point and the ground line;

wherein when an interrogating pulse is applied to one of the drive lines connected to a first key cell on said at least one sense line, the remainder of the key cells on said at least one sense line, other than the first key cell, provide substantial loading for said at least one sense line, regardless of the state of the contact switches in said remainder of key cells.

4,876,462

CONTROL CIRCUIT FOR MULTIPURPOSE INPUT TERMINAL

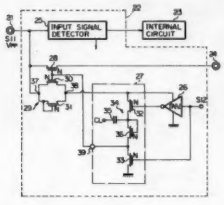
Hiroyuki Kobatake, and Toshikatsu Jinbo, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed May 31, 1988, Ser. No. 200,103

Claims priority, application Japan, May 29, 1987, 62-136895

Int. Cl.[4] H03K *17/56, 17/60*

U.S. Cl. 307—246 **12 Claims**



1. A control circuit for a multipurpose input terminal incorporated in an integrated circuit, said multipurpose input terminal being supplied with an input signal or an electric power different in voltage level from the input signal, comprising:

(a) an input signal detecting circuit operative to detect said input signal appearing at said multipurpose input terminal for relaying the input signal to an internal circuit;

(b) a first gate transistor responsive to a first control signal for providing a conduction path between said multipurpose input terminal and an output node and having a threshold voltage;

(c) a charge-pump circuit carrying out a bootstrap operation in the presence of said electric power for producing said first control signal higher in voltage level than said electric power by at least the threshold voltage of said first gate transistor, said charge-pump circuit including a series combination of a second gate transistor, at least one bootstrap circuit and a third gate transistor coupled between a power node and a reference voltage source;

(d) a transferring circuit operative to supply said power node with said electric power used for said bootstrap operation; and

(e) control means responsive to a second control signal shifting between first and second levels for controlling said second and third gate transistors, said control means complementarily making said second and third gate transistors conductive and non-conductive, respectively, thereby allowing said first gate transistor to be conductive in the presence of said second control signal of the first level and to be non-conductive in the presence of said second control signal of the second level.

4,876,463

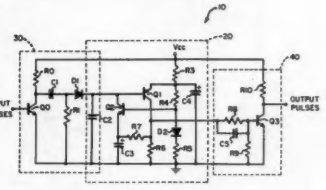
DUTY CYCLE CONTROLLER FOR HORIZONTAL SYNCHRONIZATION SIGNALS IN A TELEVISION RECEIVER

Robert L. Lyle, Knoxville, Tenn., assignor to North American Philips Corporation, New York, N.Y.

Filed Apr. 20, 1988, Ser. No. 183,964

Int. Cl.[4] H03K *5/04, 17/56, 4/08;* **H04N** *5/08*

U.S. Cl. 307—265 **36 Claims**



1. A pulse generator of controllable duty cycle having a pulse input and providing a pulsed output of controllable duty cycle, comprising:

(a) a duty cycle control loop comprising, a comparator means having an output coupled to said controllable duty cycle pulsed output, a duty cycle detector means coupled to said comparator means for detecting the duty cycle of the output of said comparator means, a duty cycle control means for setting said duty cycle of said output of said comparator means to a desired value, and an error feedback means coupled to said duty cycle control means, said duty cycle detector means, and said comparator means; and

(b) an edge trigger means for triggering a change in state of said comparator means in response to an edge of said input pulse.

4,876,464

SAMPLED DATA CIRCUIT

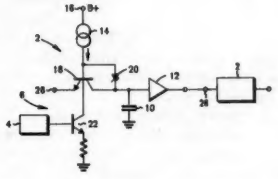
Michael J. Gay, Coppet, Switzerland, assignor to Motorola Inc., Schaumburg, Del.

Filed Mar. 18, 1988, Ser. No. 169,922

Claims priority, application United Kingdom, Mar. 19, 1987, 8706592

Int. Cl.[4] G11C *27/02*

U.S. Cl. 307—353 **6 Claims**

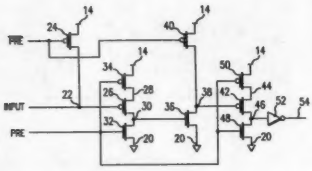


1. A sampled data circuit having two or more serially connected sampled data stages each comprising switching means and storage means; and clock means for applying to the switching means of consecutive stages clock signals for sequentially moving sampled data between consecutive stages, said clock signals having respectively first and second signal levels at which high and low currents respectively are drawn by individual stages, wherein the clock signals also have a third level intermediate the first and second levels which is occupied simultaneously by the first and second clock signals, at which the switching means act in the same manner as at the first level and at which a current substantially less than the high current is drawn by individual stages.

4,876,465
DYNAMIC CMOS BUFFER FOR LOW CURRENT SWITCHING

William J. Podkowa, and Clark R. Williams, both of Plano, Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Jun. 17, 1988, Ser. No. 208,287
Int. Cl.[4] H03K *17/16, 19/094, 3/01*
U.S. Cl. 307—443 15 Claims



1. A gate circuit for buffering a low slew rate input signal with minimum power drain, comprising:

an input node;

a first capacitive node;

a second capacitive node;

precharge means for operating during a precharge cycle to pull the second capacitive node to a low reference voltage to allow said second capacitive node to float when not in the precharge node, said input node disposed at a logic high during said precharge cycle and said second capacitive node pulled to a high reference voltage when not operating in said precharge cycle;

switch means operative during said precharge cycle to isolate said first and second capacitive nodes and in a switching mode to connect said first and second capacitive nodes together;

said switch means operating in the switching mode when said input node falls below a predetermined threshold voltage: and

means for interfacing said second capacitive node to an output node;

wherein the slew rate of the output node is a function of the rate with which said second capacitive node is pulled from said low reference voltage to said high reference voltage during the switching cycle;

wherein said precharge means comprises:

a P-channel transistor having the source-to-drain path thereof connected between said high reference voltage and said first capacitive node;

an N-channel transistor having the source-to-drain path thereof connected between said second capacitive node and said low reference voltage;

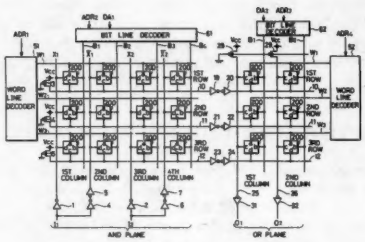
the gates of said P-channel and N-channel transistors being connected together and to a precharge clock which operates at a high logic voltage in the precharge cycle and a low logic voltage in the switching mode; and

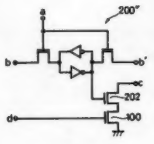
a P-channel transistor having the source-to-drain path thereof connected between said input node and said high reference voltage and the gate thereof connected to a logic low during said precharge cycle and to a logic high during said switching mode to pull said input node to a logic high during said precharge cycle.

4,876,466
PROGRAMMABLE LOGIC ARRAY HAVING A CHANGEABLE LOGIC STRUCTURE

Harufusa Kondou, and Hiroshi Kuranaga, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,763
Claims priority, application Japan, Nov. 20, 1987, 62-294557
Int. Cl.[4] G06F *7/38;* H03K *19/094*
U.S. Cl. 307—465 13 Claims





1. A programmable logic array (PLA) comprising:

a plurality of input signal lines each including a first input line for directly transmitting an input signal and a second input line for transmitting an inverted input signal;

a plurality of output signal lines crossing said input signal lines;

a plurality of programmable logic array cells at intersections of said plurality of input signal lines and said plurality of output signal lines, said programmable logic array cells forming an AND plane, each of said cells being programmable and commonly provided to a pair of said first input signal lines and said second input signal lines; and

addressing means for selecting particular ones of said programmable logic array cells, wherein each said programmable logic array cell comprises

(a) a random access memory for storing external data when selected by said addressing means, said memory being rewritable during operation of said PLA while carrying out a predetermined logic function for changing said function,

(b) switching means which are opened or closed, selectively, by outputs of said memory means, and

(c) PLA programming devices controlled by said switching means and connected to corresponding ones of said input signal lines and said output signal lines;

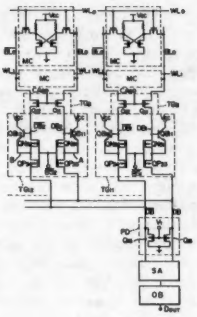
wherein said PLA is alterably programmable by data stored in said memory means.

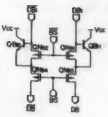
4,876,467

TRANSFER CIRCUIT FOR SIGNAL LINES

Atuo Koshizuka, Kamifukuoka, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 28, 1988, Ser. No. 291,031
Claims priority, application Japan, Jan. 11, 1988, 63-2531
Int. Cl.[4] H03K 17/60, 17/687
U.S. Cl. 307—570 9 Claims





1. A transfer circuit for controlling a signal transfer between a first signal line and a second signal line in response to a control signal comprising:

a first MIS transistor including a first electrode connected to the first signal line, a second electrode, and a gate electrode;

a second MIS transistor including a first electrode connected to the second electrode of the first MIS transistor, a second electrode connected to the second signal line, and a gate electrode; and

a bipolar transistor including a base electrode connected to the first signal line, a first electrode connected to a power supply line, and a second electrode connected to the first electrode of the second MIS transistor;

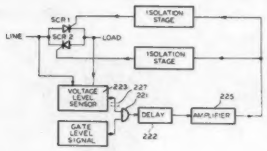
the gate electrodes of the first MIS transistor and the second MIS transistor being controlled in response to the control signal such that the first MIS transistor and the second MIS transistor operate in a complementary manner.

4,876,468

THYRISTOR DRIVER TURN-OFF CIRCUIT

James T. Libert, Waukesha, Wis., assignor to Square D Company, Palatine, Ill.

Filed Oct. 16, 1986, Ser. No. 919,914
Int. Cl.[4] F21V 33/00
U.S. Cl. 307—643 15 Claims



1. A gate drive circuit for a thyristor comprising:

means for supplying current to a gate electrode of said thyristor;

means for generating a timing signal to initiate conduction of said thyristor;

means, responsive to a voltage from cathode to anode of said thyristor, for generating a "voltage level" signal when said voltage from cathode to anode of said thyristor is reduced by conduction of said thyristor; and,

means, responsive to said "means for generating a timing signal" and said "means for generating a voltage level signal", for commanding said "means for supplying current to a gate electrode" to supply current to said gate electrode of said thyristor and for commanding said "means for supplying current to a gate electrode" to cease supplying current to said gate electrode of said thyristor at a predetermined time interval following generation of a voltage level signal by said "means for generating a voltage level signal", said predetermined time interval being chosen to be of sufficient duration to permit conduction of said thyristor to reach a stable value before current flow to said gate electrode of said thyristor ceases.

4,876,469

ROTOR OF A CRYOGENIC DYNAMOELECTRIC MACHINE

Garri M. Khutoretsky; Jury G. Tjurin; Vladimir D. Varshavsky; Galina A. Zagorodnaya, and Vladimir M. Fridman, all of Leningrad, U.S.S.R., assignors to Leningradskoe Proizvodstvennoe Electromachinostroitelnoe Obiedinenie "Electrosila" Imeni S.M. Kirova, Leningrad, U.S.S.R.

Filed May 6, 1988, Ser. No. 191,161
Claims priority, application U.S.S.R., May 14, 1987, 4245147
Int. Cl.[4] H02K 9/20, 1/20
U.S. Cl. 310—52 1 Claim

1. A rotor of a cryogenic dynamoelectric machine, comprising:

a superconducting field winding including a plurality of coils;

a supporting structure having radial slots therein, each of said radial slots accommodating one of said coils, said supporting structure further including teeth disposed between said radial slots, each of said radial slots having two side walls, said side walls provided with opposed axial grooves therein;

wedges for pressing said coils in a radial direction in said slots; and

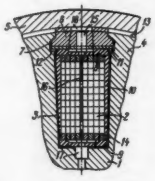
an annular shroud embracing said supporting structure to hold said coils and said wedges in said slots;

each of said wedges being fitted into the opposed axial grooves in one of said radial slots and having an outer surface which faces said annular shroud and an inner surface which faces the axis of the rotor;

each of said teeth having an outer surface facing said annular shroud;

said outer surface of each of said wedges projecting in a radial direction beyond said outer surface of each of said teeth arranged adjacent to this wedge;

said annular shroud being fitted with a radial interference on



the outer surfaces of said wedges with a first radial clearance being formed between said shround and said outer surfaces of said teeth;

a second radial clearance being formed between said inner surface of each of said wedges and the opposite surface of each of said axial grooves of said slot wherein this wedge is fitted;

the magnitude of each of said first and second radial clearances being no less than that of the radial interference of said shroud;

whereby, on cooling the rotor, loosening of said coils in said slots caused by the difference between the value of a temperature coefficient of linear expansion of the materials of said supporting structure and said field winding is eliminated.

4,876,470

GAS-COOLED ELECTRIC MACHINE

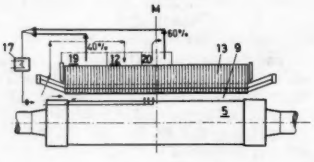
Marius Geller, Fislisbach, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Filed Jan. 14, 1988, Ser. No. 144,046

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1987, 3703594

Int. Cl.[4] H02K *9/00*

U.S. Cl. 310—59 **7 Claims**



1. An electric machine comprising:

a housing, a rotor, and a stator having a laminated body disposed in said housing, said stator having indirectly cooled stator winding conductors disposed in grooves on an inside circumference of said stator;

the laminated body of said stator comprising stacks of laminations grouped in packages of laminations separated at intervals to define radial ducts;

the radical ducts forming radially extending cooling slits, said cooling slits connecting annular air-gap cavities located at the inside circumference of said laminated stator body to chambers which are situated between an outside circumference of the laminated stator body and the housing;

said chambers comprising cold-gas chambers from which cold cooling gas is forced into associated first air gap cavitites of said laminated stator body and hot gas chambers into which heated cooling gas flows from second air gap cavities of said laminated stator body in a radially outward direction, one of said hot gas chambers being located at one end of said machine, another of said hot gas chambers being located at a central section of said machine;

cooling means which supply the cooling gas being located at least at one end of said machine, said cooling means supplying cooling gas as cold gas to the cold-gas chambers and extracting heated cooling gas from the hot gas chambers, said supply of cooling gas being cooled by at least one of said cooling means;

wherein cooling gas lines connect said hot-gas chambers to said cooling means, said hot-gas chamber located at the central section of the machine having at least one separate cooling gas line which circumvents said hot-gas chamber located at one end of the machine and said cold gas chambers and establishes a direct connection between said hot-gas chamber located at the central section of the machine and the cooler, each of said cold gas chambers being connected by additional cooling gas lines to a discharge area of one of said cooling means located at one end of said machine, said additional cooling gas lines passing through said warm gas chamber located at one end of the machine.

4,876,471

MAGNETIC DRIVE COUPLER WITH CONSTANT TORQUE INDEPENDENT OF OUTPUT SLIPPAGE

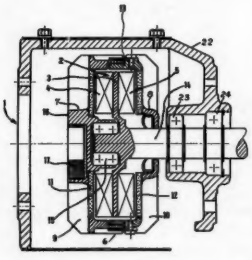
Gilles Lacour, Belley, France, assignor to L'Enrouleur Electrique Moderne, Belley, France

Filed Nov. 24, 1987, Ser. No. 124,504

Claims priority, application France, Nov. 25, 1986, 86 16947

Int. Cl.[4] H02K *49/04*

U.S. Cl. 310—105 **17 Claims**



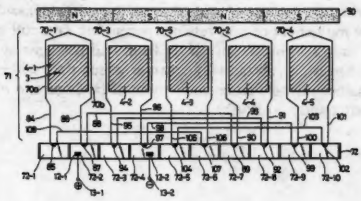
1. A magnetic coupler for transferring rotary power between a drive and a load with substantially constant torque independent of load slippage comprising; an inductive sub-unit (2) having a plurality of poles (4,5), an induced sub-unit (6) having one or more hysteresis plates (11,12), said poles and plates being mounted in confrontational relationship for relative rotary motion with respect to each other, said one or more plates being at least partly made of a molded compound containing magnetic particles embedded therein, said particles having a maximum dimension less than $\frac{1}{4}$ of the width of said poles, said particles being dispersed in 25 to 60% by volume of an electrically insulated binder, said hysteresis plates being in a heat conductive relationship with cooling elements (9,10) attached to the induced sub-unit.

4,876,472

FIVE-PHASE DC MOTOR WITH NON-OVERLAPPING ARMATURE WINDINGS

Masabu Shiraki, and Norimitsu Hirano, both of Kanagawa, Japan, assignors to Shicoh Engineering Co., Ltd., Kanagawa, Japan and M. Gottlieb Assoc., Chicago, Ill.

Filed May 25, 1988, Ser. No. 198,747
Claims priority, application Japan, Sep. 30, 1987, 62-243577
Int. Cl.[4] H02K *23/26*
U.S. Cl. 30—198 4 Claims



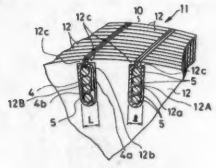
1. A 5-phase dc motor, comprising a stator including a field magnet having four alternate north and south magnetic poles of an equal angular width, a rotor including a rotor armature core having five rotor pole shoes formed at equal angular intervals thereon, said rotor pole shoes including a first rotor pole shoe formed at a position of about $a \cdot 4\pi$ radians in electrical angle, a being 0, a second rotor pole shoe formed at a position spaced by an angular distance of about $b \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe, b being 1, a third rotor pole shoe formed at a position spaced by an angular distance of about $c \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe, c being 2, a fourth rotor pole shoe formed at a position spaced by an angular distance of about $d \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe, d being 3, and a fifth rotor pole shoe formed at a position spaced by an angular distance of about $e \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe, e being 4, said rotor further including a commutator composed of ten commutator segments, first to tenth provided successively in an adjacent relationship on said rotor, a first brush connected to a positive power source terminal, a second brush connected to a negative power source terminal, said first and second brushes being disposed in a spaced relationship by an angular distance of 90° mechanical and for sliding contact with said commutator, and a conductor electrically connected to the first commutator segment and wound around said first rotor pole shoe to form an armature winding for the first phase, said conductor being introduced from said armature winding for the first phase to the second commutator segment to establish electric connection to the second commutator segment and further along an end face of said rotor armature core to the seventh commutator segment at the same phase position as the second commutator segment to establish electric connection to the seventh commutator segment, said conductor from the seventh commutator segment being further wound around said fourth rotor pole shoe formed at the position spaced by the angular distance of about $d \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe to form an armature winding for the second phase, said conductor being introduced from said armature winding for the second phase to the eighth commutator segment to establish electric connection to the eighth commutator segment and further along the end face of said rotor armature core to the third commutator segment at the same phase positions as the third commutator segment to establish electric connection to the third commutator segment, said conductor from the third commutator segment being further wound around said second rotor pole shoe formed at the position spaced by the angular distance of about $b \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe to form an armature winding for the third phase, said conductor being introduced from said armature winding for the third phase to the fourth commutator segment to establish electric connection to the fourth commutator segment and further along the end face of said rotor armature core to the ninth commutator segment at the same phase position as the fourth commutator segment to establish electric connection to the ninth commutator segment, said conductor from the ninth commutator segment being further wound around said fifth rotor pole shoe formed at the position spaced by the angular distance of about $e \cdot 4\pi/5$ radians in electrical angle from said first rotor pole shoe to form an armature winding for the fourth phase, said conductor being introduced from said armature winding for the fourth phase to the tenth commutator segment to establish electric connection to the tenth commutator segment and further along the end face of said rotor armature core to the fifth commutator segment at the same phase position as the tenth commutator segment to establish electric connection to the fifth commutator segment, said conductor from the fifth commutator segment being further wound around said third rotor pole shoe formed at the position spaced by the angular distance of about $c \cdot \pi/5$ radians in electrical angle from said first rotor pole shoe to form an armature winding for the fifth phase, said conductor being introduced from said armature winding for the fifth phase to the sixth commutator segment to establish electric connection to the sixth commutator segment and further along the end face of said rotor armature core to the first commutator segment at the same phase position as the sixth commutator segment to establish electric connection to the first commutator segment.

4,876,473

ARMATURE

Toshinori Tanaka; Shigekazu Miyazaki, and Akira Morishita, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 20, 1988, Ser. No. 221,823
Claims priority, application Japan, Jul. 20, 1987, 62-110931[U]; Aug. 27, 1987, 62-213298; Sep. 22, 1987, 62-238104
Int. Cl.[4] H02K *1/00*
U.S. Cl. 310—216 6 Claims



1. An armature comprising:

a core-sheet lamination assembly comprising a plurality of laminated disk-shaped core sheets, a plurality of first slots and at least one second slot of larger width than said first slots being formed in an axial direction of said disk-shaped core-sheets, each of said core-sheets having a plurality of first radial apertures and at least one second radial aperture of larger width than said first aperture at regular intervals in a circumference thereof;

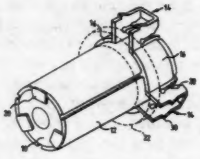
an insulation paper which is fitted in said first slots and said at least one second slot, wrapping end parts of said insulation paper overlapping each other in said second slot; and

a plurality of multi-layered coils which are mounted in said first slots and said second slot, each of said coils comprising a single turn per layer.

4,876,474
COMMUTATOR

Patrick S.-C. Wang, and Roger F. Baines, both of Repulse Bay, Hong Kong, assignors to Johnson Electric Industrial Manufactory, Limited, Chaiwan, Hong Kong

Continuation of Ser. No. 79,017, Jul. 29, 1987, abandoned. This application Sep. 9, 1988, Ser. No. 244,612
Claims priority, application United Kingdom, Dec. 11, 1986, 8629624; Mar. 16, 1987, 8706162; Mar. 30, 1987, 8707543
Int. Cl.[4] H02K *13/04*
U.S. Cl. 310—236 14 Claims



1. A rotatable pre-assembled commutator assembly, for connection to a rotatable armature of an electric motor having a winding including connector portion, said commutator assembly consisting essentially of:

a commutator base;

a plurality of commutator segments carried by said base and means securing said segments to said base;

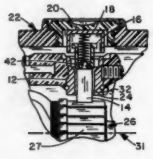
on each said segment, a terminal integral therewith, each said terminal having, extending inwardly of said terminal from a side thereof, a slot which has an open end at said terminal side and is adapted to straddle and grip a respective said winding connector portion;

whereby said commutator assembly is connectable to said armature winding by relative bodily movement of said commutator assembly and said armature for engaging all said terminal slots over respective winding connector portions.

4,876,475
BRUSH HOLDER WITH PLASTIC CUP TO RETAIN BIASING SPRING

Richard A. Smith, Chippewa Pass, Wis., assignor to Sunbeam Corporation, Downers Grove, Ill.

Filed Apr. 28, 1988, Ser. No. 187,149
Int. Cl.[4] H02K *13/00*
U.S. Cl. 310—239 18 Claims



1. A brush assembly for use in a commutator type electrical machine comprising;

an elongated carbon brush having a rectangular cross section and terminating at one end in a shouldered portion surrounding a lengthwise extending protuberance;

a brush guide having a passageway within which said brush is received, said passageway being formed to guide said brush for lengthwise rectilinear movement and to restrain said brush from rotary movement;

a coil spring;

means for mounting said coil spring in a compressed condition with one end received on said protuberance and positioned to urge said brush outwardly from said passageway;

a spring retainer which is tubular in shape to receive said one end and a portion of said coil spring, said retainer having an open end and a partially closed end;

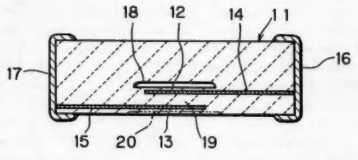
an opening formed in said partially closed end of said retainer being large enough to receive said brush protuberance but too small to permit said one end of said coil spring to pass therethrough, said spring retainer being slidable within said passageway; and

an enlargement on said open end forming a stop to limit sliding movement of said retainer, in said guide, said sliding movement of said retainer permitting said coil spring to urge said brush outwardly from said passageway until said brush is substantially worn at which time said spring retainer arrests further movement of said one end of said spring and said brush.

4,876,476
CHIP TYPE PIEZOELECTRIC DEVICE

Toshihiko Kittaka; Akira Ando, and Yukio Sakabe, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed May 2, 1988, Ser. No. 189,150
Claims priority, application Japan, Apr. 30, 1987, 62-108121
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—320 7 Claims



1. A chip type piezoelectric device comprising:

an element body formed of cofired ceramic material and having a predetermined thickness defined by first and second main surfaces;

at least a pair of first and second excitation electrodes opposed to each other and spaced apart in the direction of the thickness of said element body with a portion of said element body interposed therebetween;

at least said portion of said element body interposed between said first and second excitation electrodes having piezoelectric characteristics, said portion thereby being a vibrating portion which is excitable by said first and second excitation electrodes;

at least said first excitation electrode being positioned in the interior of said element body; and

said element body having a cavity formed therein only on the side of said first excitation electrode toward said first main surface, and outside said vibrating portion;

wherein said first and second excitation electrodes are shifted to one side toward said second main surface in the direction of the thickness of said element body.

4,876,477

COLOR TELEVISION DISPLAY TUBE

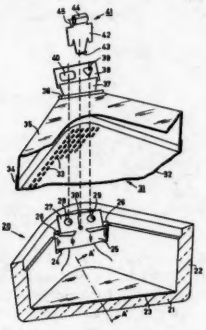
Johannes A. G. De Deugd, and Josephus J. van Moorsel, both of Groenewoudseweg 1, Eindhoven, Netherlands

Continuation-in-part of Ser. No. 642,743, Aug. 20, 1984, abandoned, which is a continuation of Ser. No. 536,225, Sep. 27, 1983, abandoned, which is a continuation of Ser. No. 270,285, Jun. 4, 1981, abandoned. This application Dec. 23, 1987, Ser. No. 137,050

Claims priority, application Netherlands, Jun. 23, 1980, 8003611

Int. Cl.[4] H01J *29/07*

U.S. Cl. 313—404 19 Claims



1. A color display tube comprising an envelope including a substantially rectangular display window, a substantially rectangular color selection electrode having four corner parts and means for mounting the color selection electrode to the display window, said means comprising:

(a) four supporting members, each attached to a respective corner of the display window; and

(b) four carrier members, each attached to a respective corner part of the color selection electrode, each carrier member including:

(1) a flat resilient element, and

(2) means for securing the flat resilient element to a respective one of the supporting members;

at least one of the flat resilient elements having a portion thereof affixed to a respective corner part of the rectangular color selection electrode by means of a single connection having a sufficiently small cross-sectional area in a first plane parallel to said portion to permit mutual rotation of the flat resilient element and the respective corner part of the color selection electrode in planes parallel to said first plane, to compensate for any rotational misalignment of the flat resilient element and the respective supporting member in a second plane parallel to the first plane.

4,876,478

CATHODE RAY TUBE APPARATUS WITH IMPROVED DEFLECTION UNIT

Katsuei Morohashi, Saitama; Jiro Shimokobe, Fukaya, and Taketoshi Shimoma, Isesaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 15, 1988, Ser. No. 168,201

Claims priority, application Japan, Mar. 16, 1987, 62-58913; Mar. 17, 1987, 62-59982

Int. Cl.[4] H01J *29/56, 29/76*

U.S. Cl. 313—413 4 Claims

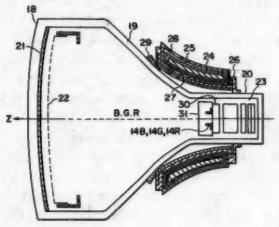
1. A color cathode ray tube apparatus comprising:

an evacuated envelope having tube axis Z;

a phosphor screen formed in said envelope, tube axis Z passing through a center of said phosphor screen, and said phosphor screen having horizontal and vertical axes X and Y orthogonal to tube axis Z;

an electron gun assembly which is an in-line type electron gun assembly, arranged in said evacuated envelope, for emitting a central beam, and side beams, toward said phosphor screen, the electron means being landed on said phosphor screen to cause said phosphor screen to emit light rays; and

deflection magnetic field generating means, arranged outside said evacuated envelope, for generating horizontal and vertical deflection magnetic fields inside said envelope so



as to horizontally and vertically deflect the electron beams and scan said phosphor screen with the electron beams, the horizontal deflection magnetic filed including a main deflection magnetic field having a barrel-shaped distribution and an auxillary deflection magnetic field, said main deflection magnetic field including a first vertical component formed in the envelope so as to be symmetrical about a Y-Z plane including Y- and Z-axes and extend along the Y-axis, said auxiliary deflection magnetic field being substantially antisymmetric about the Y-Z plane including the Y- and Z-axes and mainly composed of a second vertical component.

4,876,479

DEFLECTION YOKE FOR A COLOR CATHODE RAY TUBE

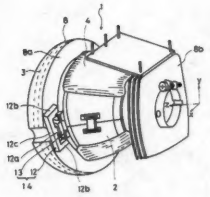
Akira Kawabata; Yoshikazu Terasaki; Takashi Inoue, and Hidenori Takita, all of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1988, Ser. No. 197,952

Claims priority, application Japan, May 25, 1987, 62-127828; May 27, 1987, 62-134270; May 28, 1987, 62-135731; Jul. 7, 1987, 62-170127

Int. Cl.[4] H01F *3/00, 7/06*

U.S. Cl. 313—440 23 Claims



1. A deflection yoke for a cathode ray tube having a funnel section and a neck section, said deflection yoke being mounted on the cathode ray tube at a location corresponding to the boundary between the funnel and neck sections, which deflection yoke comprises:

a generally tubular core;

a first deflection coil assembly including a pair of first deflec-

tion coils wound on the core and arranged in symmetrical relationship with each other with respect to the longitudinal axis of the core, said first deflection coil assembly being operable to deflect electron beams, traveling from an electron gun assembly towards a phosphor-coated screen region in a horizontal direction;

a second deflection coil assembly generally toroidally wound on the core and operable to deflect the electron beams in a vertical direction;

a pair of magnetic members mounted on the core in opposition to each other and positioned on a horizontal axis perpendicular to the longitudinal axis of the core while spaced 180° from each other about the longitudinal axis of the core, each of said magnetic members being constituted by a generally elongated body having at least two legs, said two legs being spaced from each other in a vertical direction and protruding from the elongated body; and

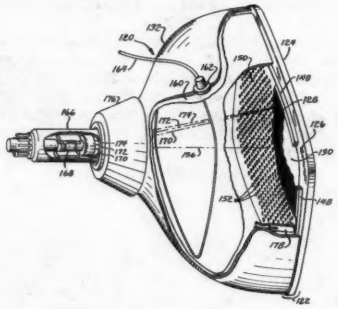
a magnetizing means for each magnetic member for developing predetermined poles in the legs of each of the magnetic members, thereby developing a magnetic deflection force to deflect the electron beams deflected by the first and second deflection coil assembly and traveling towards any one of the four corner areas of the phosphor-coated screen region in a direction away from the horizontal axis while minimizing the magnetic deflection force in the horizontal direction in the vicinity of the horizontal axis.

4,876,480

LOW-COST, SELF-POLISHED COLOR CRT FLAT FACEPLATE

Kazimir Palac, deceased, late of Carpentersville, Ill. (by Phyllis J. Palac, heir); by Judith A. Palac, heir, East Lansing, Mich.; by Donald T. Palac, heir, North Ridgeville, Ohio, and by Susan M. Palac, heir, River Forest, Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation of Ser. No. 947,787, Dec. 30, 1986, abandoned.
This application Jun. 24, 1988, Ser. No. 212,111
Int. Cl.[4] H01J *29/86*
U.S. Cl. 313—477 R **5 Claims**



1. A low cost color CRT front assembly for mounting to and positioning around a forward edge of a funnel having an open front, said assembly comprising:

a self-polished flat faceplate having a float glass composition, wherein said float glass flat faceplate is characterized as having first and second spaced optically smooth surfaces formed without grinding or polishing of said faceplate and a peripheral edge portion with the forward edge of the funnel coupled in a sealed manner to the first surface of said flat faceplate about the peripheral edge portion thereof, and wherein the peripheral edge portion of said flat faceplate extends beyond the funnel's periphery to facilitate secure mounting of said flat faceplate on the funnel and eliminate the requirement for precisely matching the size of said flat faceplate with the dimensions of the front of the funnel;

a phosphor screen deposited upon a first surface of said faceplate;

a metal foil shadow mask; and

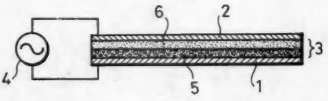
support means for affixing said shadow mask to said flat faceplate and for maintaining said shadow mask in a stretched condition under high tension.

4,876,481

ELECTROLUMINESCENT ELEMENT

Yuji Taniguchi, Furukawa, and Masaru Banju, Miyagi, both of Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Aug. 4, 1988, Ser. No. 228,665
Claims priority, application Japan, Nov. 30, 1987, 62-180992[U]
Int. Cl.[4] H01J *1/62*
U.S. Cl. 313—502 **6 Claims**



1. An electroluminescent element comprising:

a transparent electrode, an opposed electrode, and a luminous layer interposed between said transparent electrode and said opposed electrode, said luminous layer being composed of a phosphor layer and a dielectric layer, so that application of an electric field across the two electrodes causes the luminous layer to glow,

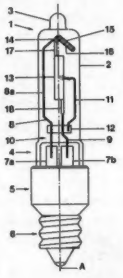
wherein said phosphor layer contains a cyanoethyl resin as the binder resin and said dielectric layer contains a powder of ferroelectric substance dispersed in a mixture of two fluoroplastics, a first of which is solid at normal temperature and a second of which is liquid at normal temperature.

4,876,482

HALOGEN CYCLE INCANDESCENT LAMP STRUCTURE

Karl Stadler, Adelsschlag-Ochsenfeld, Fed. Rep. of Germany, assignor to Patent-Treuhand-Gesellschaft für elektrische Glühlampen, Munich, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 272,214
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 8716797
Int. Cl.[4] H01K *1/18*
U.S. Cl. 313—579 **11 Claims**



1. A halogen cycle incandescent lamp having

a base (5);

a closed, essentially cylindrical bulb (2) extending from a

near end portion close to the base to a remote end portion and defining a lamp axis (A);

an axially extending filament (13) having a near filament end close to the base and a remote filament end;

a filament mount (10) including

first and second lead-in conductors (8, 9), and

a cross element (12) retaining said lead-in conductors in position in the bulb;

the first lead-in conductor (8) extending from the cross element toward the remote end portion of the bulb and having a longitudinal portion (8*a*) extending along an inner wall of the bulb to retain the remote end of the filament;

a pinch or press seal (4) secured in the base and connecting the mount with external current conductors,

and wherein, in accordance with the invention,

the first lead-in conductor (8), at approximately the level of the remote end of the filament, is bent in essentially inverted V or roof or arch form defining a first leg (14) extending upwardly from the longitudinal portion to an apex of the inverted essentially V or arch shape, and a second leg (15) extending downwardly from the apex;

said first lead-in conductor being further formed with a reentrant portion (16) integral with the second leg (15) and extending towards the lamp axis (A) and having a terminal end which is bent in a direction of the axis of the lamp,

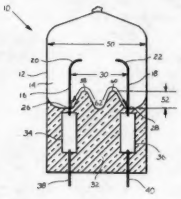
said first and second legs spanning diametrically almost across the diameter of the bulb without touching the inner wall of the bulb, and said first and second legs (14, 15) and said reentrant portion (16) and said longitudinal portion (8*a*) all being located in a common plane.

4,876,483

ARC LAMP WITH SURFACE ARC RESISTANT BARRIER

David A. Cox, Lexington, Ky., assignor to GTE Products Corporation, Danvers, Mass.

Filed May 26, 1988, Ser. No. 199,233
Int. Cl.[4] H01J *61/10, 61/30*
U.S. Cl. 313—634 6 Claims



1. An arc discharge lamp with a surface arc resistant barrier comprising:

(a) an envelope formed of a nonconductive radiant energy transmissive mate rial defining by an interior surface on enclosed volume with an included fill gas,

(b) two arc discharge electrodes generally side by side having root portions positioned in and separated only by nonconductive mate rial, and emerging from the interior surface defining an electrode separation distance and projecting for a distance into the enclosed volume,

(c) two electrode connections leading from the exterior of the envelope to electrically join the two respective electrodes, and

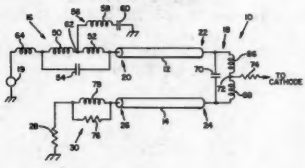
(d) at least two dielectric barriers formed along the interior surface of the envelope and between the electrode roots and extending into the enclosed volume for a distance less than the electrode projection distance thereby establishing a dielectric barrier between the electrodes.

4,876,484

REMOTE VIDEO INTERCONNECT AND METHOD

Roy O. Mitchell, Hillsboro; Milton D. Klaudt, Beaverton, and Kathleen F. M. Ullom, West Linn, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 904,076, Sep. 5, 1986, abandoned. This application Aug. 15, 1988, Ser. No. 241,812
Int. Cl.[4] H05B *41/14;* H03H *7/38*
U.S. Cl. 315—94 11 Claims



1. A cathode drive circuit for driving a cathode of a cathode ray tube from a signal source over a wide range of frequencies comprising:

a first transmission line having an input, an output and a characteristic impedance;

a second transmission line spaced apart from the first transmission line, the second transmission line having an input, an output and a characteristic impedance;

terminating means for terminating the output of the second transmission line with a load matching the characteristic impedance of said second transmission line;

impedance matching means coupling the output of the first transmission line, the cathode of the cathode ray tube and the input of the second transmission line, for:

providing a signal from the output of the first transmission line to the cathode;

providing across the output of the first transmission line an impedance equal to the characteristic impedance of said first transmission line; and

providing across the input of the second transmission line an impedance equal to the characteristic impedance of said second transmission line;

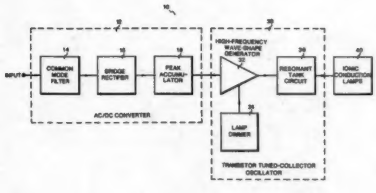
whereby reflections within the cathode drive circuit are substantially avoided.

4,876,485

BALLAST FOR IONIC CONDUCTION LAMPS

Leslie Z. Fox, 2712 Colby Ave., West Los Angeles, Calif. 90064

PCT No. PCT/US86/00285, § 371 Date Sep. 17, 1987, § 102(e) Date Sep. 17, 1987, PCT Pub. No. WO87/04889, PCT Pub. Date Aug. 13, 1987
PCT Filed Feb. 10, 1986, Ser. No. 132,946
Int. Cl.[4] H05B *41/14, 41/38*
U.S. Cl. 315—244 18 Claims



1. An improved ballast for ionic conduction lamps comprising:

(a) an electrical power supply,

(b) means for generating a high frequency electrical signal

where said generating means is powered by said power supply, and

(c) a phosphor coated ionic conduction lamp connected to the high frequency electrical signal from said generating means where the signal excites the phosphor causing said lamp to ioieze and illuminate.

4,876,486

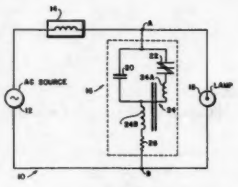
TWO-LEAD STARTER CIRCUIT FOR A GASEOUS DISCHARGE LAMP

Fernando A. Joanino, Skokie, Ill., assignor to Advance Transformer Co., Chicago, Ill.

Filed Dec. 30, 1987, Ser. No. 139,688

Int. Cl.[4] H05B *41/14*

U.S. Cl. 315—290 **2 Claims**



1. A two-lead starter circuit for a gaseous discharge lamp, of the type having first and second leads connected in parallel with said lamp during operation, said starter circuit comprising a capacitor, a bilateral voltage-sensitive switch, a pulse transformer having a primary winding and a step-up secondary winding, and a resistor, said bilateral voltage-sensitive switch being connected in series with the primary winding of said pulse transformer, said capacitor being connected in parallel with the series combination of said bilateral voltage-sensitive switch and said primary winding to form a series-parallel circuit, said step-up secondary winding being connected in series with said resistor, and the series combination of said secondary winding and said resistor being connected in series with said series-parallel circuit between said first and second leads.

4,876,487

LOW VOLTAGE ILLUMINATING LAMP SET WITH PROGRAMMABLE OUTPUT FOR GARDEN USE

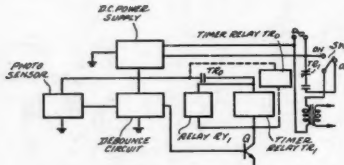
Jerry S. C. Yang, 5-1 Tay Pyng St., Shi Hwu Jenn, Jang Huah Shiann, Taiwan

Continuation of Ser. No. 850,552, Apr. 11, 1986, abandoned, which is a division of Ser. No. 377,170, May 11, 1982, Pat. No. 4,593,234. This application Jun. 20, 1988, Ser. No. 208,801

The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.

Int. Cl.[4] H02B *1/08*

U.S. Cl. 315—362 **15 Claims**



1. An apparatus for controlling at least one illuminating lamp comprising:

illuminating lamp means for producing an illumination in response to an illuminating signal applied thereto;

light sensing means for generating a first output signal when an ambient illumination level has fallen below a predetermined level;

RC circuit means, coupled to said first output signal, for charging with a predetermined time constant when said first output signal is produced, to produce a charging signal indicative of an amount of charge;

zener diode means, coupled to said charging signal, for conducting only when a voltage of said charging signal exceeds a threshold, said zener diode means producing a second output signal as a result of said conducting, said second output thereby being produced at a predetermined time after said first output signal is produced; and

switching means for supplying said illuminating signal to said illuminating lamp means, when said second output signal is generated by said zener diode means, and said first output signal is also present.

4,876,488

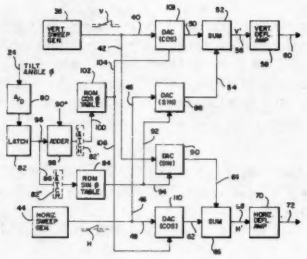
RASTER ROTATION CIRCUIT

Geoffrey E. Gentile, Hammonton, N.J., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 30, 1987, Ser. No. 102,676

Int. Cl.[4] H01J *29/52*; G06F *15/626*; G09G *1/06*

U.S. Cl. 315—378 **4 Claims**



1. A system for rotating images on a raster display unit by electronically rotating, via digital computation, deflection circuits of the raster display unit to compensate for tilting of the display unit through a tilt angle, comprising:

a raster display unit having a horizontal display axis and a vertical display axis;

a horizontal deflection circuit and a vertical deflection circuit connected to said display unit to produce horizontal and vertical raster sweeps on said display unit;

a horizontal sweep generator for said display unit having a variable analog horizontal output signal;

a vertical sweep generator for said display unit having a variable analog vertical output signal;

analog signal means supplying an analog tilt angle signal for rotating a display image on said display unit with respect to said horizontal and vertical axes by an amount determined by said tilt angle;

tilt angle signal conversion means connected to said analog signal means for conversion of said analog tilt angle signal to a corresponding digital tilt angle signal;

a first read only memory means connected via digital data path to said conversion means and responsive to said digital tilt angle signal to produce a corresponding digital sine function signal;

first and second tilt angle sine function modulators each responsive to said digital tilt angle signal comprising, respectively, first and second multiplying digital-to-analog converters connected to said first read only memory and responsive to said digital sine function signal;

a second read only memory means connected via a digital data path to said conversion means and responsive to said

digital tilt angle signal to produce a corresponding digital cosine function signal,

first and second tilt angle cosine function modulators each responsive to said tilt angle signal comprising respectively, third and fourth multiplying digital-to-analog converters connected to said second read only memory and responsive to said digital cosine function signal;

first means connecting said analog horizontal output signal to said first multiplying digital to analog converter and to said third multiplying digital-to-analog converter for multiplying said analog horizontal output signal by the sine and by the cosine of said tilt angle to provide first and second modified analog horizontal sweep signals;

second means connecting said analog vertical output signal to said second multiplying digital to analog converter and to said fourth multiplying digital to analog converter for multiplying said analog vertical output signal by the sine and by the cosine of said tilt angle to provide first and second modified analog vertical sweep signals;

third means connecting said first modified analog horizontal sweep signal and said second modified analog vertical sweep signal to the vertical deflection circuit of said display unit; and

fourth means connecting said second modified analog horizontal sweep signal and said first modified analog vertical sweep signal to the horizontal deflection circuit of said display unit, whereby said horizontal and vertical deflection circuits rotate said horizontal and vertical display axis and horizontal and vertical raster sweeps by an amount determined by said tilt angle.

4,876,489

SIGNAL PROCESSING

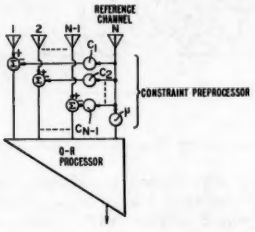
Christopher D. Cawthorne, Hertford, Great Britain, assignor to STC PLC, London, United Kingdom

Continuation of Ser. No. 127,908, Dec. 2, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 290,875

Claims priority, application United Kingdom, Dec. 9, 1987, 8629426

Int. Cl.[4] G01S *3/16*

U.S. Cl. 342—383 **6 Claims**



1. A method for digitally correcting I/Q phase and amplitude imbalances within signal channels and for correcting interchannel phase and amplitude mismatches in arrays of signal channels, in which method the correcting operations are combined, the method comprising forming I and Q channels from one said channel, orthogonalising the I and Q channels of the one said signal channel, which one said signal channel comprises a reference channel, and employing the orthogonalised I and Q channels of the reference channel to correct phase and amplitude imbalances in the reference channel, and simultaneously commencing correcting another said signal channel, which comprises an auxiliary channel, by forming I and Q channels from said auxiliary channel, and orthogonalising the said Q channel of the auxiliary channel with the I channel of the reference channel.

4,876,490

BATTERY OPERATED MOTOR DRIVE FOR SMALL APPLIANCES

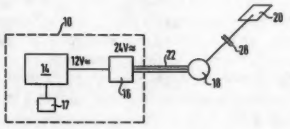
Walter Kolb, Betzdorf/Sieg, Fed. Rep. of Germany, assignor to Wolf-Gerate GmbH, Fed. Rep. of Germany

Filed Dec. 17, 1987, Ser. No. 134,010

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1986, 3643558

Int. Cl.[4] H02K *7/14*

U.S. Cl. 318—17 **10 Claims**



1. An electric motor drive system for hand guided tools, comprising:

a tool for being motor operated;

a battery power source;

a converter comprising an electronic circuit for converting the direct current from the battery to multi-phase current;

a multi-phase drive motor connected between the electronic circuit and the tool for operating the tool, the converter being adapted for delivering an adjustable frequency voltage, adjusted for speed control of the motor, in a range between 50 and 500 Hz;

a portable power pack containing the electronic circuit and the battery; and

a carrier bag for accommodating the power pack, the carrier bag being provided with suspension straps.

4,876,491

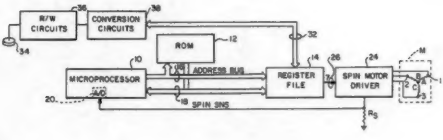
METHOD AND APPARATUS FOR BRUSHLESS DC MOTOR SPEED CONTROL

John P. Squires, Jamestown, and Louis J. Shrinkle, Boulder, both of Colo., assignors to Conner Peripherals, Inc., San Jose, Calif.

Continuation of Ser. No. 880,754, Jul. 1, 1986, abandoned. This application Feb. 26, 1988, Ser. No. 163,222

Int. Cl.[4] H02P *6/02*

U.S. Cl. 318—138 **30 Claims**



5. A commutatorless direct current motor having a rotor for rotating with respect to a stator, said motor comprising:

(a) means, provided on the rotor, for establishing a plurality of first magnetic fields;

(b) means, provided on the stator, for inducing a second magnetic field; and

(c) control means, coupled to said inducing means, for directing a discrete short-period inducement of said second magnetic field and a discrete long-period inducement of

said second magnetic field wherein said discrete short period inducement is insufficient to cause rotation of said rotor and said discrete long-period inducement is sufficient to cause rotation of said rotor, said control means including means for monitoring the interaction of said discrete short-period induced second magnetic field with said first magnetic fields.

27. A method of operating a control system for providing rotation control of a hard-disk drive spin motor, wherein the spin motor includes a rotor having a plurality of permanent magnet poles and a stator having a plurality of windings, each winding having first and second ends with the first ends of the windings being interconnected and wherein a spin motor drive current circuit is coupled to the second ends of the windings for switching current through phase pairs of the windings as defined by pairs of said second ends, said spin motor drive current circuit providing a sense signal proportional to the magnitude of the current conducted through the phase pairs of windings, the method comprising the steps of:

(a) applying a short-duration period current pulse to each phase pair of windings, where said short-duration current pulse is insufficient to cause rotation of said rotor to the next pole position relative to said stator;

(b) acquiring the sense signal produced by said spin motor drive current circuit in response to the respective application of the short-duration period current pulses;

(c) comparing the sense signals acquired to identify a phase pair of windings corresponding to an acquired sense signal distinguishable from the remaining acquired sense signals; and

(d) selecting a phase pair of windings for the conduction of a long-duration period current pulse to induce rotation of the rotor.

4,876,492

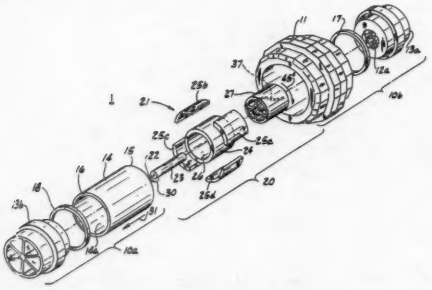
ELECTRONICALLY COMMUTATED MOTOR DRIVEN APPARATUS INCLUDING AN IMPELLER IN A HOUSING DRIVEN BY A STATOR ON THE HOUSING

Gene D. Lester, Louisville; Richard A. Morgan, Mt. Washington, both of Ky.; Harold B. Harms, Fort Wayne, Ind.; John P. Barrett, Birmingham, Mich.; Tsung K. Chang, Louisville, Ky.; Donald S. Cushing, Lady Lake, Fla.; Richard F. Broo, Farmington Hills, Mich., and William M. Hood, Akron, Ohio, assignors to General Electric Company, Fort Wayne, Ind.

Filed Feb. 26, 1988, Ser. No. 160,526

Int. Cl.[4] F04B *35/04;* H02K *29/00*

U.S. Cl. 318—254 **32 Claims**



1. An apparatus for pumping fluid comprising:

an inlet adapted to engage an inlet conduit for conveying the fluid to the apparatus; and

an outlet adapted to engage an outlet conduit for conveying the fluid away from the apparatus;

a housing connecting said inlet and said outlet;

means, located within and adapted to rotate within the housing, for moving fluid through the housing from said inlet to said outlet; and

means secured to the exterior of the housing for applying an electromagnetic field through the housing to and around the fluid moving means to rotate the fluid moving means and thereby to cause it to move fluid through the housing, said means for applying including a stator assembly having a plurality of winding stages spaced circumferentially about said housing to surround said housing.

32. An electronically commutated motor comprising:

a housing having an axis;

a rotatable assembly coaxial with said housing and including:

a cylindrical ferromagnetic member having an axial opening coaxial with the axis;

a cylindrical element to be rotated and adapted to be received in the axial opening of said cylindrical ferromagnetic member; and

a plurality of permanent magnet elements peripherally secured to the ferromagnetic member;

means coaxial with the axial opening of the ferromagnetic member and within the housing for supporting said rotatable assembly for rotation about the assembly axis; and

a stationary assembly having a plurality of winding stages circumferentially spaced about said housing, said winding stages adapted to be electrically energized to apply an electromagnetic field to said rotatable assembly to cause the rotatable assembly to rotate about the axis.

4,876,493

MOTOR CONTROLLING SWITCH DEVICE

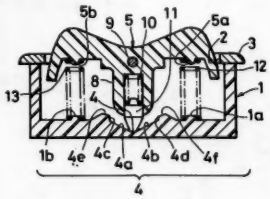
Masaru Suzuki, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Dec. 23, 1987, Ser. No. 137,083

Claims priority, application Japan, Dec. 24, 1986, 61-202290; Mar. 31, 1987, 62-49733; Mar. 31, 1987, 62-49730; Mar. 31, 1987, 62-49731

Int. Cl.[4] H02P *1/22;* B60J *1/17;* H01H *21/00, 71/18*

U.S. Cl. 318—293 **43 Claims**



1. A motor controlling switch device comprising:

a casing;

an operating member provided in said casing, said operating member being movable from an original position to a first operating position and from said first operating position to a second operating position in response to the application of an operating force to said operating member;

a depressing piece disposed in one of said casing and said operating member;

first restoring means acting in cooperation with said depressing piece for restoring said operating member from said first operating position to said original position when said operating force is removed from said operating member and said operating member has moved to said first operating position;

holding means for holding said operating member in said second operating position when said operating member moves through said first operating position to said second operating position, said holding means comprising a holding protrusion acting in cooperation with said depressing piece;

switch circuit means for supplying a locking current to an

electric drive means in response to the movement of the operating member; and

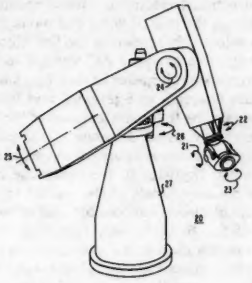
second restoring means disposed in said casing for restoring said operating member from said second operating position to said original position, said switch circuit means supplying said second restoring means with said locking current when said operating member moves to said second operating position, said second restoring means including at least one restoring member made of a material capable of being restored to an original stretched configuration when supplied with said locking current to thereby restore the operating member to said original position from said second operating position through said first operating position.

4,876,494

POSITION AND VELOCITY FEEDBACK SYSTEM FOR A DIGITAL ROBOT CONTROL

Kenneth E. Daggett, Murrysville, Pa.; Eimei M. Onaga, Brookfield Center, and Richard J. Casler, Jr., Newtown, both of Conn., assignors to Unimation, Inc., Danbury, Conn.

Continuation of Ser. No. 932,853, Nov. 20, 1986, abandoned.
This application Apr. 1, 1988, Ser. No. 178,811
Int. Cl.[4] G05B *19/42*
U.S. Cl. 318—568.22 **16 Claims**



1. A digital control for a robot having a plurality of arm joints, said control comprising:

an electric motor constituting a joint motor for driving each of the robot arm joints;

a power amplifier operable to supply drive current to each joint motor;

feedback control loop means for each joint motor including at least digital position and velocity control loops operable at a predetermined sampling rate to control the associated power amplifier;

encoder means for generating a plurality of signals representing joint motor position changes;

a digital feedback system responsive to said encoder means to provide position and velocity feedback signals for said feedback control means at the predetermined sampling rate;

said feedback system including circuit means having means responsive to said encoder means signals to accumulate a count of increment pulses representing incremental changes in position and operating as said position feedback signal for said feedback control means;

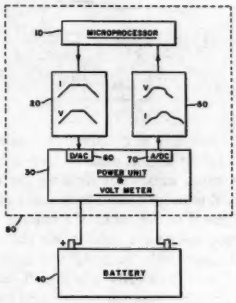
said circuit means further having means for detecting the elapsed time between successive increment pulses, the elapsed time being detected by first determining the time interval between the start of a sample pulse and the start of a first increment pulse which occurs before the next sample pulse, and for adding the time interval between the end of the last increment pulse in the sample period and the start of the next sample pulse, which defines the sample period, and then subtracting this time interval summation from the time period between the two sample pulses which define the sample period. and means for computing velocity from the elapsed time and generating said velocity feedback signal for said feedback control means.

4,876,495

APPARATUS AND METHOD FOR CHARGING AND TESTING BATTERIES

Thirumalai G. Palanisamy, Morris Township, Morris County, and Stuart E. Mendelson, Kendall Park, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 27, 1988, Ser. No. 211,609
Int. Cl.[4] H02J *7/04*
U.S. Cl. 320—18 **4 Claims**



1. A method for charging a rechargeable battery which comprises the steps of:

(a) measuring the open circuit voltage of said battery and estimating the minimum number of cells possible for the measured open circuit voltage;

(b) charging said battery at any charge rate and at a substantially constant or constant current until the battery charge voltage equals or is substantially equal to the estimated number of cells of the battery multiplied by a predetermined voltage which is characteristic of the battery;

(c) charging said battery at a charge rate and at a constant or substantially constant voltage equal to or substantially equal to the battery charge voltage in step (b) until the charge current decreases to a predetermined low value;

(d) repeating steps (a), (b) and (c) until step (a) indicates a constant or substantially constant value for the estimated number of cells;

(e) charging said battery at a constant or substantially constant voltage equal to or substantially equal to said constant or substantially constant value of step (d) times a voltage which is characteristic of the battery cells until the current decreases to zero or a predetermined low value; and

(f) charging the said battery with a predetermined constant or substantially constant current at any voltage for a predetermined period of time.

4,876,496

CURRENT SUPPLYING DEVICE

Richard C. Duncan, Scarborough, Canada, assignor to Allanson, Division of Jannock Limited, Toronto, Canada

Filed Feb. 22, 1988, Ser. No. 158,932
Int. Cl.[4] H02J *7/04*
U.S. Cl. 320—31 **9 Claims**

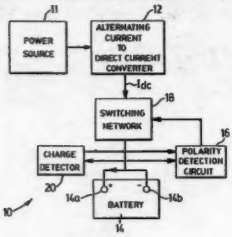
1. A current supplying device connectable across the positive and negative terminals of a battery for supplying a direct current to said positive terminal, said device comprising:

means for connecting said device to a power supply for supplying said direct current;

a pair of circuits each biased to an inoperative condition, each of said circuits being actuable to an operative position to supply said direct current to one of said terminals;

polarity detection means in communication with said circuits, said polarity detection means for sensing the polarity of said terminals and generating switching signals upon determination of the polarity of said terminals;

switch means responsive to said switching signals to actuate



one of said circuits to said operative condition tc supply said direct current to said positive terminal;

overload protection means for limiting the direct current applied to said polarity detection means and inhibiting the operation thereof in the event of a current overload; and

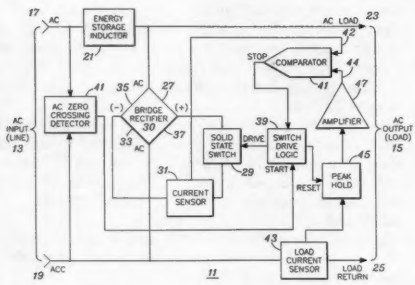
charge detection means for monitoring the charge of said battery and electrically isolating said polarity detection means from said terminals when said battery is fully charged to prevent overcharging of said battery.

4,876,497

POWER FACTOR CORRECTOR

Frank Colver, Costa Mesa, Calif., assignor to HC Power, Inc., Santa Ana, Calif.

Filed Sep. 20, 1988, Ser. No. 247,039
Int. Cl.[4] G05F 1/70
U.S. Cl. 323—211 **15 Claims**



1. A power factor correction circuit connectable to receive an AC input waveform across a pair of input terminals and to communicate an AC output waveform across a pair of output terminals, said output terminals being connectable to a load, the circuit comprising:

an energy storage inductor having an input connected to one of the AC input terminals and an output connected to one of the output terminals;

a short circuit path connecting the output terminals; and

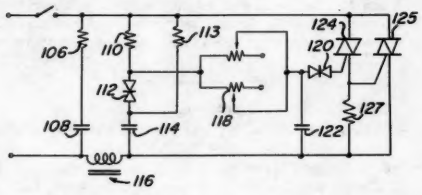
control circuitry for selectively enabling the short circuit path during a portion of each half cycle of the AC input voltage waveform.

4,876,498

TWO WIRE LOW VOLTAGE DIMMER

David G. Luchaco, Macungie, Pa., and Charles C. Houng, Clinton, N.J., assignors to Lutron Electronics Co. Inc., Coopersburg, Pa.

Continuation of Ser. No. 839,304, Mar. 13, 1986, abandoned. This application Nov. 17, 1987, Ser. No. 122,588
Int. Cl.[4] G05F 5/02
U.S. Cl. 323—300 **20 Claims**



1. A circuit for controlling the RMS value of an AC voltage applied to a partially resistive and partially inductive load comprising:

(a) only a pair of wires for connection in series with the load and an AC supply voltage;

(b) first bidirectional electronic switch means operatively coupled across the pair of wires and having control input means for selectively rendering the first electronic switch means conductive to apply AC voltage to the load, the first electronic switch means having first and second thyristors, each having a gate terminal and first and second main terminals, the first main terminal of the first thyristor being operatively coupled to one of the pair of wires, a first resistor operatively coupling the second main terminal of the first thyristor to the other one of the pair of wires, the main terminals of the second thyristor operatively coupled directly across the pair of wires, the gate terminal of the first thyristor receiving control signals from the control circuit, the gate terminal of the second thyristor being operatively coupled to a junction between the first resistor and the second main terminal of the first thyristor, the first and second thyristors each having a holding current characteristic, the holding current characteristic of the first thyristor being substantially less than the holding characteristic of the second thyristor,

(c) a control circuit operatively coupled to the control input means and responsive to the instantaneous magnitude of the AC voltage appearing across the pair of wires for repetitively rendering the first electronic switch means conductive at selected periods of time defining a firing angle; and

(d) voltage compensating means in series with correction means operatively coupled across the pair of wires for regulating the RMS value of the AC voltage applied to the load and for correcting asymmetries in the waveform of the AC voltage applied to the load.

4,876,499

DIFFERENTAL VOLTAGE CONTROLLED EXPONENTIAL CURRENT SOURCE

James R. Anderson, Chicago, and Richard Brander, Cicero, both of Ill., assignors to Beltone Electronics Corporation, Chicago, Ill.

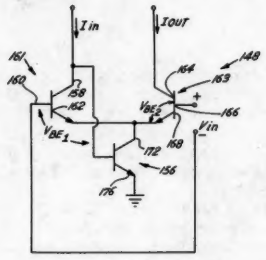
Continuation of Ser. No. 202,664, Jun. 6, 1988, Pat. No. 4,829,270, which is a division of Ser. No. 838,924, Mar. 12, 1986, Pat. No. 4,792,977. This application Nov. 10, 1988, Ser. No. 269,618
Int. Cl.[4] G05F 3/22
U.S. Cl. 323—312 **1 Claim**

1. A current source for providing an output current substantially exponentially related to a difference between voltages on a first input terminal and a second input terminal and substan-

tially linearly related to an input current applied to a third input terminal comprising, in combination:

a first transistor having a collector, base, and emitter, said collector being interconnected to said third input terminal, said base sensing said voltage on said first input terminal and having a first base to emitter voltage;

a second transistor, having a second transistor base interconnected to said collector of said first transistor and a second transistor collector, interconnected to said emitter of said



first transistor, as feedback means to regulate said first base to emitter voltage, whereby said first transistor collector current is substantially equivalent to said input current; and

a third transistor, having a third transistor emitter interconnected to said emitter of said first transistor, having a third transistor base to sense said voltage on said second input terminal, and having a third transistor collector for responsively drawing said output current.

4,876,500

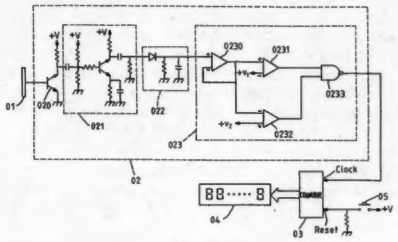
USER CARRIED SENSOR FOR DETECTING DISPLACEMENT RELATIVE TO THE GROUND

Chuan-Chueng Wu, No. 15, Lane 41, Ta-Tung Road, Fei-Sha Tsun, Su-Hu Hsiang, Yun-Lin Hsien, Taiwan

Filed Aug. 3, 1988, Ser. No. 227,615

Int. Cl.[4] G01R *27/26;* **G01C** *22/00;* **G01B** *7/00*

U.S. Cl. 324—61 R **14 Claims**



1. A motion-sensing arrangement, comprising:

(a) sensor means positioned in a predetermined relationship relative to the body of a user performing a movement relative to the ground, said sensor means being operative for sensing changes in the elevation, and in the size of the contact area, between the user and the ground, said sensor means being further operative for generating, in response to said sensing, an electrical signal having a variable voltage amplitude proportional to said changes;

(b) converter means for converting the variable electrical signal into a rectified electrical signal having a component with a generally fixed voltage amplitude; and

(c) comparator means operatively connected to the converter means, and operative for generaing an output signal when the generally fixed voltage component falls within a predetermined voltage range.

4,876,501

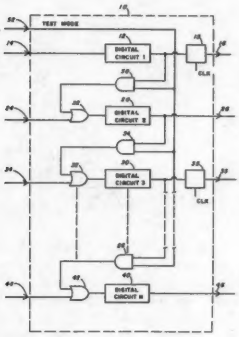
METHOD AND APPARATUS FOR HIGH ACCURACY MEASURMENT OF VLSI COMPONENTS

Joseph L. Ardini, Needham; Brian Lefsky, West Newton, and Barbara J. Farr, Newton, all of Mass., assignors to Prime Computer, Inc., Natick, Mass.

Continuation of Ser. No. 37,708, Apr. 13, 1987, abandoned. This application Dec. 14, 1988, Ser. No. 285,362

Int. Cl.[4] G01R *31/00*

U.S. Cl. 324—73 R **12 Claims**



4. A method for measuring propagation delay through a digital integrated circuit including a plurality of digital circuits each having an operational signal path therethrough, with test equipment having an operating speed that is comparable to the operating speed of said plurality of digital circuits, said method comprising the steps of:

individually coupling the outputs of selected ones of said plurality of digital circuits to the inputs of other selected ones of said plurality of digital circuits in series to define a test signal path on said integrated circuit through said selected digital circuits, said test signal path having an input node and an output node;

applying a test signal to the input node of said test signal path; and

measuring the propagation delay between the test signal applied to the input node and an output signal which propagates through said test signal path and appears at the output node, whereby the propagation delay through said test signal path is the sum of the individual propagation delays through each of the digital circuits in the test signal path, and is substantially longer than the propagation delay through any of said digital circuits and can be accurately and directly measured by said test equipment without further processing.

4,876,502

WIDE DYNAMIC RANGE CURRENT MEASURING APPARATUS

William R. Verbanets, Plum Borough, and Robert T. Elms, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 9, 1988, Ser. No. 192,059

Int. Cl.[4] G01R *19/25, 19/257*

U.S. Cl. 324—115 **9 Claims**

1. Wide dynamic range current measuring apparatus comprising:

a current transformer having a primary winding and a secondary winding in which a secondary current proportional to a current flowing in the primary winding is induced;

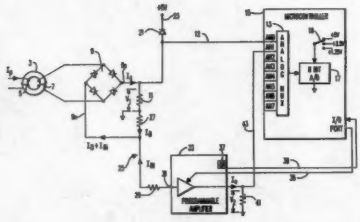
an analog to digital converter having a plurality of discrete

selectable reference voltages providing a plurality of resolutions for a digital signal generated thereby;

an amplifier with programmable gain and with means generating an overrange signal when the amplifier output exceeds a preset limit;

means applying a signal proportional to said secondary current to said amplifier;

means applying the output of the amplifier to said analog to digital converter to generate said digital signal; and



control means responsive to said overrange signal selecting the highest programmable gain of the amplifier which does not produce an overrange signal, selecting in response to the magnitude of the digital signal generated by the analog to digital converter the selectable reference voltage for the analog to digital converter which provides the greatest resolution of said digital signal and providing an output signal including said digital signal and a scale factor which is a function of both the selected gain of said amplifier and the selected reference voltage of the analog to digital converter.

4,876,503

METHOD OF MEASURING THE INTENSITY OF A DC CURRENT AND A DEVICE IMPLEMENTING THIS METHOD

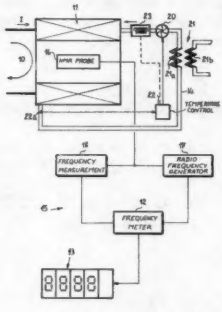
Guy Aubert, Grenoble, France, assignor to Thomson-CGR, Paris, France

PCT No. PCT/FR85/00343, § 371 Date Oct. 3, 1986, § 102(e) Date Oct. 3, 1986, PCT Pub. No. WO86/03843, PCT Pub. Date Jul. 3, 1986

PCT Filed Nov. 29, 1985, Ser. No. 901,512

Int. Cl.[4] G01R *33/00, 15/00*

U.S. Cl. 324—117 R **8 Claims**



1. A device for measuring the intensity of a DC current flowing in a circuit, including a magnetic coil intended to be inserted in series in said circuit for generating a magnetic field in a given volume of space, means for determining at least the temperature of said coil, means for stabilizing the temperature of said coil, means for measuring the magnetic field in said given volume and means for linearly determining said intensity from said measurement of the magnetic field and from said temperature.

4,876,504

APPARATUS FOR INVESTIGATING THE CONDITION OF A BACTERIA CONTAINING SUSPENSION THROUGH FREQUENCY PROFILE OF ELECTRICAL ADMITTANCE

Barry C. Blake, and David J. Clarke, both of Wiltshire, United Kingdom, assignors to Public Health Laboratory Service Board, England

Division of Ser. No. 829,644, Jan. 31, 1986, Pat. No. 4,810,963. This application Nov. 9, 1988, Ser. No. 269,173

Claims priority, application United Kingdom, Apr. 3, 1984, 8408529

Int. Cl.[4] G01N *27/74, 27/02;* **G01R** *27/22;* **A61B** *5/05*

U.S. Cl. 324—204 **7 Claims**

1. Apparatus for investigating the condition of a suspension of bacteria in a medium, comprising:

a chamber comprising a conduit filled with the medium in use;

a pair of electrodes positioned to contact said medium contained within the chamber;

means for producing a controlled continuous flow of said medium through said conduit between said electrodes;

voltage generator means electrically connected with said electrodes and serving to generate an alternating voltage of selected frequency across said electrodes, thereby causing an alternating current to flow in said medium therebetween;

coil means disposed so that a time varying voltage is induced therein by a time-varying magnetic field associated with said alternating current flow in the medium;

means for measuring said induced voltage; and

processor means, including means for controlling said voltage generator means to generate said alternating voltage at a plurality of frequencies and for also controlling said measuring means to provide an output corresponding to said induced voltage at said frequencies for generating a profile therefrom of measured induced voltage in the coil means as a plot thereof against a plurality of different selected frequencies of the alternating voltage applied to the electrode, said profile being indicative of a condition of the bacteria suspended in said medium.

4,876,505

APPARATUS AND METHOD FOR MONITORING STEAM TURBINE SHROUD CLEARANCE

Robert L. Osborne, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 27, 1988, Ser. No. 199,633

Int. Cl.[4] G01B *7/14, 7/30;* **G01R** *33/02*

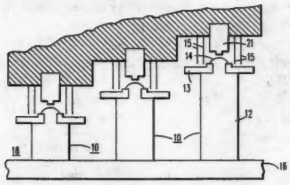
U.S. Cl. 324—208 **26 Claims**

1. A system for monitoring the clearance between a plurality of turbine blade shroud segments configured in a row and a stationary portion of a turbine, comprising;

means for measuring the clearance between the stationary portion of the turbine and each of the shroud segments a

number of times along each shroud segment under dynamic conditions;

means for averaging said measurement to produce an average clearance value for each shroud segment;



means for analyzing said average clearance values for each shroud segment to determine when the clearance between a shroud segment and the stationary portion of the turbine is approaching a critical value; and

means for developing control signals in response to said means for analyzing.

4,876,506

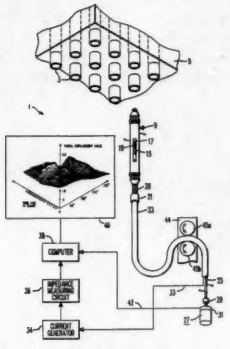
APPARATUS AND METHOD FOR INSPECTING THE PROFILE OF THE INNER WALL OF A TUBE EMPLOYING A WALL FOLLOWER AND AN EDDY CURRENT PROBE

Stephen D. Brown, Delmont; Warren R. Junker, Monroeville, and Francis X. Gradich, Elizabeth Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 13, 1988, Ser. No. 205,768

Int. Cl.[4] G01B *7/28, 7/14;* **G01N** *27/90;* **G21C** *17/00*

U.S. Cl. 324—220 **24 Claims**



1. An apparatus for inspecting the profile of the inner wall of a conduit, comprising:

a. a probe body insertable within said conduit:

b. a probe assembly disposed within said probe body including a non-magnetic conductive plate means, and an eddy current probe means spaced from said plate means on one side thereof for generating a signal indicative of the distance between itself and said plate means, said plate and probe means being movably mounted with respect to one another to vary said distance, and

c. a wall follower assembly movably mounted within said probe body including a follower body having an outside portion for resiliently following the profile of the inner wall of a conduit, and an inside portion fixedly connected to the plate means of said probe assembly on a side thereof opposite said one side for converting changes in the conduit wall profile to changes in distance between said probe means and said plate means of said probe assembly.

4,876,507

METHOD OF AND DEVICE FOR AUTOMATIC PHASE CORRECTION OF COMPLEX NMR SPECTRA

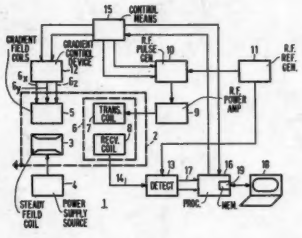
Johannes J. Van Vaals, Eindhoven, Netherlands, assignor to U.S. Philips Ltd., New York, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,914

Claims priority, application Netherlands, Nov. 12, 1987, 8702700

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—307 **20 Claims**



1. A method of correcting phase errors in a complex magnetic resonance spectrum obtained by Fourier transformation from samples of at least one resonance signal excited in an object situated in a steady, uniform magnetic field by means of R.F. electromagnetic pulses, said complex magnetic resonance spectrum having peak locations and phase values in the peak locations, said method comprising: determining the coefficients of a frequency-dependent phase function extending across the complex spectrum from the phase values in selected peak locations in such a manner that said function meets a predetermined best fit criterion, and correcting phase errors in the complex spectrum by means of the frequency-dependent phase function determined.

4,876,508

METHOD AND APPARATUS FOR NMR IMAGING

David G. Taylor, Guildford, England, assignor to Surrey Medical Imaging Systems Ltd., Guildford, England

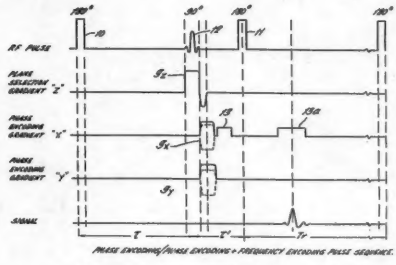
PCT No. PCT/GB88/00066, § 371 Date Nov. 29, 1988, § 102(e) Date Nov. 29, 1988, PCT Pub. No. WO88/06288, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 4, 1988, Ser. No. 259,000

Claims priority, application United Kingdom, Feb. 10, 1987, 8702951

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **6 Claims**



1. A method of NMR imaging in which phase and frequency encoding of precessing nuclear spins are performed on the same spatial axis.

4,876,509

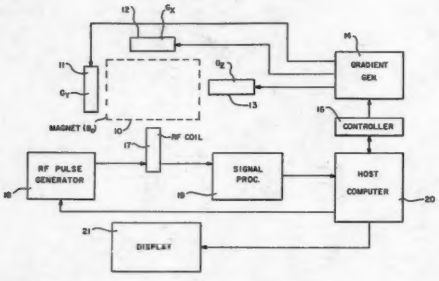
IMAGE RESTORATION PROCESS FOR MAGNETIC RESONANCE IMAGING RESONANCE IMAGING

Robert J. Perlmutter, Palo Alto, Calif., assignor to Resonex, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 942,604, Dec. 17, 1986, abandoned. This application Nov. 3, 1987, Ser. No. 116,437

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 16 Claims



1. An image restoration process for correcting the warped reconstructed image produced by a magnetic resonance imaging (MRI) method where by determining the inhomogeneities of the magnetic field used in the MRI method corrected pixel locations for a corrected image are calculated, each such pixel location having a known offset, 1_V, 1_H, from a group of four pixels (x_1, x_2, x_3, x_4) of the reconstructed warped image each of said four pixels having a known intensity value including a signal portion and a noise portion, said restoration process interpolating said four values to determine an intensity value for said corrected pixel location comprising the following steps:

for each corrected pixel location, y, computing the corresponding intensity value using

$$y = \sum_{i=1}^{4} \alpha_i X_i$$

where α_i is the relative weight to be given each x_i in computing said intensity value of y, by determining α_1, α_2, α_3, α_4 within the following constraints and taking into account said offset:

$$\alpha_i \geq 0 \qquad i = 1, 2, 3, 4 \qquad \text{I.}$$

$$\sum_{i=1}^{4} \alpha_i = 1 \qquad \text{II.}$$

$$\sum_{i=1}^{4} \alpha_i^2 = \beta^2 < 1 \qquad \text{III.}$$

where β^2 is a constant and whereby noise variance of said noise portion is uniform for each corrected pixel location and is independent of location of each pixel within said group of four pixels;

and displaying or storing said computed intensity values for each corrected pixel location to provide a said restored image.

4,876,510

APPARATUS FOR NUCLEAR SPIN TOMOGRAPHY HAVING SUPERCONDUCTING BASE FIELD MAGNETIC COILS AND A RADIATION SHIELD

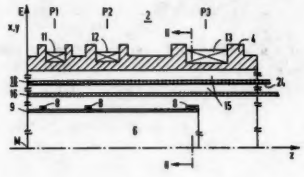
Horst Siebold, and Günter Ries, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 12, 1988, Ser. No. 193,513

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718755

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—318 15 Claims



1. A magnet coil system for a nuclear spin tomography apparatus comprising;

superconducting base field coils for generating a homogeneous magnetic base field, said superconducting base field coils defining an interior region;

gradient coils that are not superconducting positioned within said interior region for developing magnetic field gradients;

at least one cooled radiation shield that is electrically and thermally conducting and comprises a superconducting material of a second kind having a high superconducting transition temperature; and

said shield is positioned between said gradient coils and said superconducting base field coils and has a nonsuperconducting state during a starting process and a superconducting state during undisturbed operation of the magnetic coil system.

4,876,511

METHOD AND APPARATUS FOR TESTING AND CALIBRATING AN ELECTROMAGNETIC LOGGING TOOL

Brian Clark, Missouri City, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Oct. 20, 1988, Ser. No. 260,536

Int. Cl.[4] G01V *13/00, 3/28, 3/30*

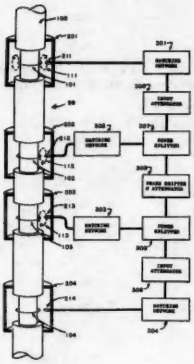
U.S. Cl. 324—338 14 Claims

8. An apparatus for testing an electromagnetic logging tool having an electromagnetic field transmitting antenna and at least one longitudinally spaced electromagnetic field receiving antenna, said apparatus comprising:

a. means positioned in the proximity of said transmitting antenna for detecting a primary magnetic field generated by said transmitting antenna and generating a signal representative thereof;

b. means coupled to said detecting means and responsive to said generated signal representative of the primary field

for producing in the proximity of said receiving antenna a secondary magnetic field that simulates the transmitted



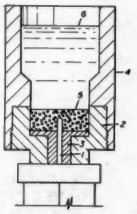
electromagnetic field after it has propagated through a geological formation of known properties.

4,876,512

METHOD FOR RAPIDLY DETERMINING THE SWELLING-CLAY CONTENT IN SHALES AND SHALY SANDSTONE FORMATIONS BY HIGH-FREQUENCY DIELECTRIC CONSTANT MEASUREMENTS

Michael K. Kroeger; John M. Longo; Ronald P. Steiger, all of Houston, and Peter K. Leung, Sugar Land, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Mar. 30, 1988, Ser. No. 175,081
Int. Cl.[4] G01V *3/06, 3/12*
U.S. Cl. 324—376 **43 Claims**



1. A method for measuring the swelling-clay content of earth formations by dielectric measurements, comprising the steps of:

(a) grinding a sample of the earth formation to a size suitable for testing;

(b) washing the sample with a fluid having a water activity substantially less than that of water;

(c) packing the washed sample into a sample cell suitable for dielectric measurement;

(d) measuring the dielectric constant of the washed sample at a preselected frequency; and

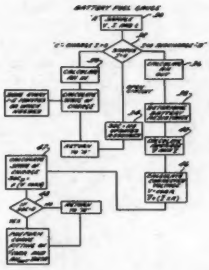
(e) comparing the measured dielectric constant of the rock sample to a calibration curve, to determine the swelling-clay content of the earth formation.

4,876,513

DYNAMIC STATE-OF-CHARGE INDICATOR FOR A BATTERY AND METHOD THEREOF

George H. Brilmyer, and William H. Tiedemann, both of Cedarburg, Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Dec. 5, 1988, Ser. No. 279,213
Int. Cl.[4] G01N *27/46*
U.S. Cl. 324—427 **10 Claims**



1. A dynamic state of charge indicator for a storage battery characterized by a discharge curve relating available energy of said battery to a contemporaneous voltage over a range of voltage boundaries having predetermined end points corresponding to fully charged and effectively discharged for one charge cycle, said indicator comprising:

(a) microprocessor means for storing predetermined relationships between the contemporaneous voltage and the state of charge of the battery;

(b) voltage sensor means for monitoring battery voltage and providing a battery voltage signal to said microprocessor means;

(c) current sensor means for monitoring current flow through said battery and providing a battery current signal to said microprocessor means;

(d) said microprocessor means computing:

(1) the internal resistance of said battery;

(2) the average voltage and current for a net discharge time period;

(3) the corrected voltage as a total of internal resistance voltage loss and average voltage; and

(4) the state of charge as a function of the corrected battery voltage; and

(e) means for displaying the state of charge

4,876,514

SWITCHING AND TESTING SYSTEM

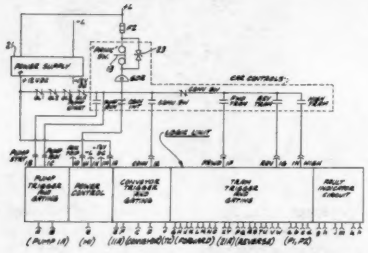
Vernon C. Evans, New Athens, and George H. Heidinger, Sparta, both of Ill., assignors to Peabody Coal Company, St. Louis, Mo.

Division of Ser. No. 902,217, Aug. 29, 1986. This application Jun. 24, 1988, Ser. No. 211,298
Int. Cl.[4] G01R *31/02*
U.S. Cl. 324—556 **5 Claims**

1. In combination, an electronic testing system and an electronic switching system responsive to a control signal for connecting an electric load to a voltage supply, the electrical load being operable from controls; wherein the electronic switching system comprises:

electronic switch means having a control element which is responsive to a control voltage difference to cause said switch means to become conductive, said switch means being a switch terminal connected to a first supply line and another switch terminal connected to the first electrical load, means responsive to the controls for generating the control voltage difference when the voltage supply is connected to the first supply line thereby powering the

first electrical load from the first supply line, means responsive to the controls for generating first and second control signals, a first contactor responsive to the first control signal for connecting the voltage supply to a first supply line, the first electrical load connected to the first supply line, a second contactor responsive to the second control signal for connecting a second supply line to the first supply line thereby connecting the voltage supply to the second supply line and causing said means for generating the control voltage difference to interrupt power through the electronic switch means thereby discontinuing the supply of power to the first electrical load, means for disconnecting the electrical loads from the switching system, indicating means responsive to the controls only



when the switching system is in a testing mode for indicating a fault in the switching system, and the indicating means including terminals; and

the testing system comprises:

a connector having a plurality of electrical terminals adapted for connection to the switch terminal connected to the first electrical load and to the terminals of the indicating means when the electrical loads have been disconnected from the switching system, the connector for placing the switching system in the test mode when connected;

electrical circuit means for connecting the switch terminal to the indicating means;

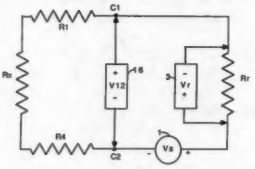
whereby operation of the control associated with the first electrical load will actuate the indicating means to indicate proper operation of the switching system.

4,876,515

SELF-CHECKING OHMMETER THAT CHECKS FOR CONTACT RESISTANCE OF ITS PROBES

Edward R. Ball, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 8, 1987, Ser. No. 48,021
Int. Cl.[4] G01R *27/14*
U.S. Cl. 324—538 **19 Claims**



1. Apparatus for providing accurate information pertaining to the resistance of means under test, said apparatus comprising:

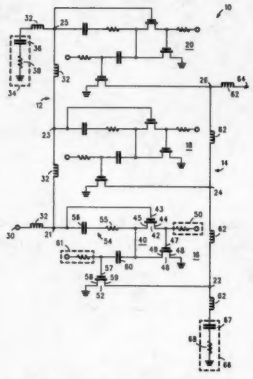
ohmmeter means for providing a resistance reading, connecting means coupled to said ohmmeter means and manually operable for establishing connection with said means under test, wherein said connection is characterized as resistive, and means coupled to said connecting means for determining the acceptability of the resistance of said connection between said ohmmeter means and said means under test for indicating the accuracy of the ohmmeter reading, the relative resistance of said connection being determined relative to reference resistance of said ohmmeter means and separately from said ohmmeter reading.

4,876,516

HIGH GAIN DISTRIBUTED AMPLIFIERS

Richard M. Dougherty, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 27, 1989, Ser. No. 302,525
Int. Cl.[4] H03F *3/60*
U.S. Cl. 330—54 **11 Claims**



1. A high gain distributed amplifier comprising:

input transmission means for supplying an input signal;

a plurality of darlington type amplifier means;

a plurality of FET type amplifier means;

one each of said plurality of FET type amplifier means coupled in series to a corresponding one of said plurality of darlington type amplifier means to form a plurality of cascaded elements;

output transmission means;

each of said cascaded elements including an input coupled in parallel to said input transmission means, and having an output coupled in parallel to said output transmission means;

said plurality of darlington type amplifier means and said plurality of FET type amplifier means for amplifying said input signal; and

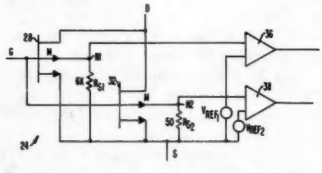
said output transmission means for combining a first portion of said amplified signal from each of said cascaded elements to output said combined first portion of said amplified signal.

4,876,517

CIRCUIT FOR SENSING FET OR IGBT DRAIN CURRENT OVER A WIDE DYNAMIC RANGE

Christopher G. Arcus, San Jose, Calif., assignor to Ixys Corporation, San Jose, Calif.

Filed Jun. 17, 1988, Ser. No. 208,290
Int. Cl.[4] H03F *3/16*
U.S. Cl. 330—277 **18 Claims**



1. A circuit for sensing very small currents flowing through

an FET having a source terminal, a drain terminal, and a mirrow terminal comprising:

a comparator having a first input terminal coupled to the mirror terminal of the FET and a second input terminal coupled to a reference voltage;

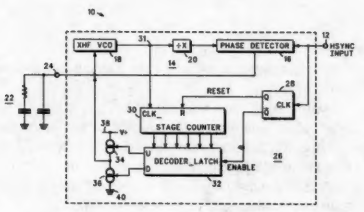
a high resistance coupled between the mirror terminal of the FET and a ground potential; and

wherein the high resistance is greater than the source to drain resistance of the FET.

4,876,518
FREQUENCY TRACKING SYSTEM

Geoffrey W. Perkins, Chandler, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Dec. 2, 1988, Ser. No. 279,182
Int. Cl.[4] H03L *7/00*
U.S. Cl. 331—1 A **10 Claims**



1. A system for tracking an applied input signal the frequency of which may vary over a predetermined range, comprising:

a phase locked loop including a phase detector having first and second inputs and an output, said first input being coupled to an input of the system to which the input signal is applied, a controlled oscillator, means for coupling said oscillator to said second input of said phase detector, and means coupled to said output of said phase detector for providing a direct current control signal to said controlled oscillator whenever the frequency of said oscillator is greater or less than the frequency of the applied input signal by a predetermined amount;

digital frequency counting means forming a closed loop with said controlled oscillator for digitally counting the frequency of said oscillator and comparing the same to the frequency of the applied input signal and for providing an error signal to said means for providing a direct current control signal whenever said oscillator frequency is outside a predetermined frequency range of the input signal frequency such that the frequency of said oscillator automatically tracks the frequency of the applied input signal.

4,876,519
HIGH FREQUENCY ECL VOLTAGE CONTROLLED RING OSCILLATOR

Craig M. Davis, Santa Clara, and Richard R. Rasmussen, Fremont, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

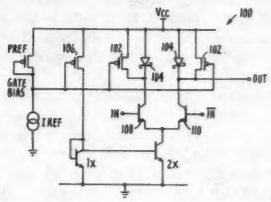
Filed Jan. 23, 1989, Ser. No. 299,768
Int. Cl.[4] H03B *1/00*
U.S. Cl. 331—57 **11 Claims**

1. Emitter-coupled logic circuitry comprising:

(a) a plurality of input transistors having commonly-coupled emitters, each input transistor having a collector;

(b) a current source connected between the commonly-coupled emitters and ground; and

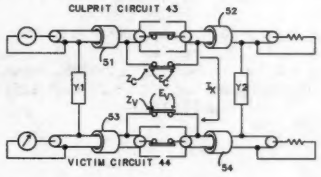
(c) variable resistive means connected between the collectors of the input transistors and a supply voltage for controlling the charging current provided to the collectors of the input transistors.



4,876,520
COAXIAL SWITCHING SYSTEM WITH SWITCHED SHIELDS AND CROSSTALK SUPPRESSION

David P. Kjosness, Longmont, and Joe E. Marriott, Loveland, both of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 79,568, Jul. 30, 1987, Pat. No. 4,766,401.
This application Apr. 28, 1988, Ser. No. 187,101
The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.
Int. Cl.[4] H04B *3/28*; H01P *1/12*
U.S. Cl. 333—12 **1 Claim**



1. A circuit for switching transmission lines comprising:

first and second segments of a first transmission line having a center conductor and a shield;

a first coaxial relay having first and second center conductor and shield contacts, the first center conductor and shield contacts respectively coupled to the center conductor and shield of the first segment of the first transmission line;

a second coaxial relay having first and second center conductor and shield contacts, the second center conductor and shield contacts respectively coupled to the center conductor and shield of the second segment of the first transmission line;

a first section of interconnecting transmission line having a center conductor and a shield, at one end of the first section the center conductor being connected to the second center conductor contact of the first coaxial relay and the shield being connected to the second shield contact of the first coaxial relay, and at the other end of the first section the center conductor being connected to the first center conductor contact of the second coaxial relay, and the shield of the first section being left unconnected to the second shield contact of the second coaxial relay;

a first relay means, coupled to the shield contacts of the first and second coaxial relays, for electrically connecting those shield contacts together whenever the first and second coaxial relays are closed;

first and second segments of a second transmission line having a center conductor and a shield;

a third coaxial relay having first and second center conductor and shield contacts, the first center conductor and

shield contacts respectively coupled to the center conductor and shield of the first segment of the second transmission line;

a fourth coaxial relay having first and second center conductor and shield contacts, the second center conductor and shield contacts respectively coupled to the center conductor and shield of the second segment of the second transmission line;

a second section of interconnecting transmission line having a center conductor and a shield, at one end of the second section the center conductor being connected to the second center conductor contact of the third coaxial relay and the shield being connected to the second shield contact of the third coaxial relay, and at the other end of the second section the center conductor being connected to the first center conductor contact of the fourth coaxial relay, and the shield of the second section being left unconnected to the second shield contact of the fourth coaxial relay; and

a second relay means, coupled to the shield contacts of the third and fourth coaxial relays, for electrically connecting those shield contacts together whenever the third and fourth coaxial relays are closed.

4,876,521

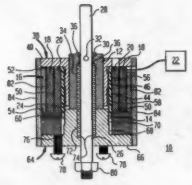
TRIPPING COIL WITH FLUX SHIFTING COIL AND BOOSTER COIL

Donald R. Boyd, Sanford, N.C., assignor to Siemens Energy & Automation, Inc., Atlanta, Ga.

Continuation of Ser. No. 89,298, Aug. 25, 1987, abandoned. This application May 31, 1988, Ser. No. 203,554

Int. Cl.[4] H01H *9/00*

U.S. Cl. 335—179 **8 Claims**



1. A tripping coil for tripping a circuit breaker, comprising:

a translatable armature;

a permanent magnet for biasing the armature;

a coil unit having a first winding and a second winding, wherein the first and second windings are mutually radially adjacent, each winding producing a magnetic flux when energized, the first winding being energizable such that it produces a magnetic flux which assists the magnetic flux of the permanent magnet in biasing the armature into a biased position, the second winding being energizable such that it produces a magnetic flux which opposes the magnetic flux of the permanent magnet urging the armature into an unbiased position when the first winding is not energized to produce a magnetic flux which assists the magnetic flux of the permanent magnet, the armature being translatable between the biased position and the unbiased position; and

means for connecting the armature to the circuit breaker such that the circuit breaker is tripped when the armature moves to the unbiased position.

4,876,522

ELECTROMAGNETIC SWITCHGEAR

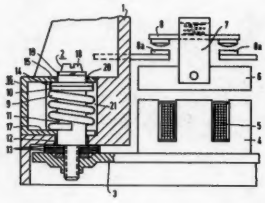
Norbert Mittlmeier, Amberg, and Bardo Koppmann, Kaltenbrunn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,428

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732428

Int. Cl.[4] H01H *3/60, 51/08*

U.S. Cl. 335—193 **7 Claims**



1. An electromagnetic switchgear having a housing top comprising:

(a) a movable switching magnet part;

(b) a movable contact part coupled with said movable switching magnet part and guided in the housing top;

(c) a fixed contact part disposed in said housing top;

(d) a bottom plate holding a non-switching magnet part, said bottom plate closing off the housing top;

(e) at least one screw having a screw head and screw threads which couple the housing top to the bottom part;

(f) at least one resilient damping element associated with said screw and which permits movement of the bottom plate relative to the housing part and further wherein the bottom plate has a bore which receives said screw threads and the at least one damping element comprises a compression spring braced at one end either directly or indirectly against the screw head and, at the other end, against the housing top.

4,876,523

SWITCH FOR CIRCUIT BREAKER

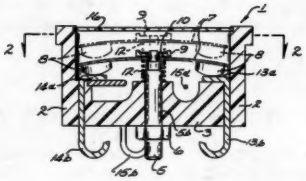
Osami Kushida; Hisamitsu Ninomiya; Masakazu Nezuka, all of Gotemba, and Yoshihiko Ishikawa, Tokyo, all of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 19, 1988, Ser. No. 259,641

Claims priority, application Japan, May 2, 1988, 63-109735

Int. Cl.[4] H01H *85/04, 37/00*

U.S. Cl. 337—299 **6 Claims**



1. A switch device comprising a deformable member that deforms in response to variations in its temperature used to control the position of a movable contact which is movable into and out of engagement with a stationary contact, the deformable member being a snap acting disc mounting thereon the movable contact, an aperture formed through the disc and a support member including a protrusion which extends from

the bottom of the disc up through the aperture supporting the deformation member, a plate having an aperture extending therethrough being received on top of the disc with the protrusion extending through the aperture in the plate, the deformation member and the support member being mutually fixed by means of a meltable material with the meltable material engaging the protrusion and the plate to lock the disc to the support, the meltable material melting at the time of an emergency, with the deformable member becoming separated from its support to thereby open an electrical circuit.

4,876,524

SIX-AXIS JOYSTICK CONTROL

Richard L. Jenkins, 224 13th Ave. N.E., Calgary, Alberta, Canada (T2E 1B7)

Continuation of Ser. No. 885,691, Jul. 15, 1986, abandoned. This application Jun. 20, 1988, Ser. No. 208,794
Claims priority, application Canada, Jul. 19, 1985, 487089
Int. Cl.[4] G01L *1/22*
U.S. Cl. 338—2 **36 Claims**

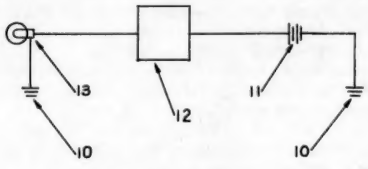
1. A control device comprising:
an elastic beam;
strain gauges attached to the surface of said beam;
a first group of not more than three of said strain gauges each having an operative axis thereof inclined with a single predetermined angle with respect to the main axis of said beam,
said strain gauges being disposed at a first predetermined level along said beam.

4,876,525

EMERGENCY WARNING BRAKE SYSTEM

Sylvia Gross, 228 E. St., Easthampton, Mass. 01027

Filed Feb. 22, 1988, Ser. No. 158,794
Int. Cl.[4] B60Q *1/26*
U.S. Cl. 340—436 **1 Claim**



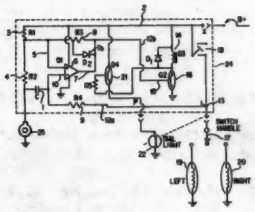
1. In a vehicle equipped with an external signal visible to other motorists, which indicates that the brakes of said vehicle have been applied; and equipped with an antiskid brake system:
control system, in combination with an antiskid brake system, in combination with an external brake signal visible to other motorists, controlling the brake signal to pulsate when the antiskid brake system pulsates.

4,876,526

HEAVY DUTY FLASHER

Joseph Spiteri, P.O. Box 243, Harborcreek, Pa. 16421

Filed Apr. 29, 1988, Ser. No. 187,967
Int. Cl.[4] B60Q *1/38*
U.S. Cl. 340—471 **4 Claims**



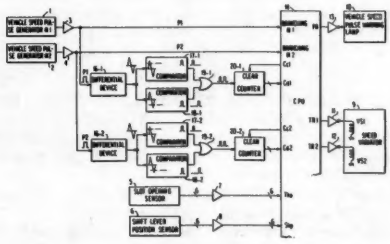
1. In combination with a turn signal having power and light terminals and a switch handle for conducting current from said light terminal to left or right turn signal lights,
a flasher having a ground terminal connected to ground and power and light terminals connected to the corresponding turn signal terminals,
an op-amp connected between ground and said power terminal,
said op-amp having a non-inverting input connected to an above ground terminal of a voltage divider and an inverting input connected to ground through a capacitor and connected to said light terminal through a resistor,
said op-amp having an output which is positive when the voltage on the non-inverting input exceeds the voltage on the inverting input and which is negative or ground when the voltage on the inverting input exceeds the voltage on the non-inverting input,
a relay for furnishing current from the power terminal to the light terminal, and means for turning said relay "on" when the op-amp output is positive and "off" when the op-amp output is negative or ground.

4,876,527

VEHICLE SPEED DETECTING DEVICE

Hiroki Oka, Toyota, and Nobuyoshi Nagura, Anjo, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Sep. 29, 1988, Ser. No. 250,899
Claims priority, application Japan, Sep. 29, 1987, 62-245627
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 340—441 **2 Claims**



1. A vehicle speed detecting device comprising first and second vehicle speed pulse generators, each of which provides electrical pulses proportionate to the vehicle speed, vehicle speed calculation means for calculating the vehicle speed based on said electrical pulses, means for memorizing the vehicle

speed, means for counting the pulses generated by said vehicle speed pulse generators, abnormality detecting means for producing an abnormal operation signal when the count value of one of said vehicle speed pulse generators is lower than a predetermined value when the vehicle speed calculated by the vehicle speed calculation means is greater than the predetermined vehicle speed, means for transferring the electrical pulses for the calculation of the vehicle speed from one pulse generator to the other pulse generator and means for initiating an alarm in response to the abnormality signal.

4,876,528

METHOD OF DETECTING A DEFLATED TIRE ON A VEHICLE

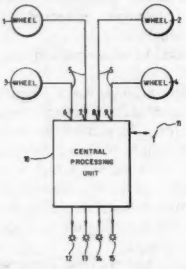
John C. Walker, and Thomas Holmes, both of Sutton Coldfield, England, assignors to SP Tyres UK Limited, Birmingham, England

Filed May 13, 1988, Ser. No. 193,741

Claims priority, application United Kingdom, May 13, 1987, 8711310

Int. Cl.[4] B60C *23/00*

U.S. Cl. 340—442 **11 Claims**



1. A method of detecting a partially deflated pneumatic tire on a vehicle having four tires, each mounted on a wheel, which comprises

sensing the angular velocity of each wheel and producing a signal proportional thereto,

processing the four signals in a processor unit which subtracts the sum of the signals from one pair of diagonally opposite wheels from the sum of the signals from the other pair of diagonally opposite wheels,

sensing when the magnitude of the result is between 0.05% and 0.60% of the mean of the sums,

comparing the signals for each of the four wheels in turn with the signals for each of the other wheels,

sensing when one of said signals is different from the average of all four signals by more than 0.1%, and in the event of both sensed signal factor bring present, operates a warning device to indicate a tire is partially or complete deflated.

4,876,529

METHOD AND SYSTEM FOR DETECTING THE LEVEL OF ENGINE OIL OF AN ENGINE

Shin'ichi Kubota; Hideyo Miyano, and Hiromitsu Adachi, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 921,129, Oct. 21, 1986, abandoned. This application Sep. 13, 1988, Ser. No. 244,579

Claims priority, application Japan, Oct. 21, 1985, 60-234733

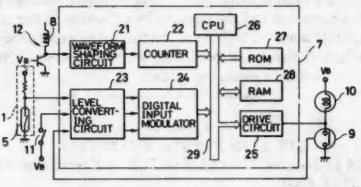
Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—450.3 **8 Claims**

1. A method for detecting a level of an engine oil of an engine having an oil pan, comprising:

a first step including timer means for detecting that said engine has operated for more than a first predetermined time period required for a sufficient temperature rise of the engine oil to reduce viscosity of the engine oil, and producing a first detection output signal;

a second step for detecting that said engine has stopped for more than a second predetermined time period required



for the engine oil to return to the oil pan from the engine after the stop of the engine, after said first detection signal is generated, and producing a second detection signal; and

a third step for detecting an oil level after generation of said second detection signal.

4,876,530

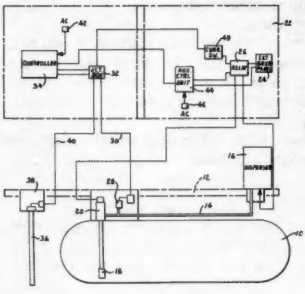
METHOD AND APPARATUS FOR DETECTING LEAKAGE IN FUEL STORAGE AND DELIVERY SYSTEMS

Wayne E. Hill, Bucyrus, Kans., and Dennis McEachern, Concord, N.C., assignors to The Marley Company, Mission Woods, Kans.

Filed Oct. 13, 1987, Ser. No. 108,275

Int. Cl.[4] G01M *3/26*; G08B *21/00*

U.S. Cl. 340—605 **32 Claims**



1. A method of detecting leakage from a product line through which liquid is pumped and in which the liquid is subject to possible thermally induced contraction, said method comprising the steps of:

monitoring the pressure in the product line;

measuring the time required for the produce line pressure to drop from one preselected pressure level to a lower preselected pressure level during a first cycle;

raising the pressure in the product line from said lower preselected pressure level to a level at least as high as said one preselected pressure level;

measuring the time required for the product line pressure to drop from said one preselected pressure level to said lower preselected pressure level during a second cycle; and

interpreting the drops in pressure as resulting from a leak in the product line unless the time measured during said second cycle exceeds the time measured during first cycle by a predetermined amount.

4,876,531
POSITION DETECTOR FOR THE MOVABLE ELEMENT OF A FLUID-OPERATED ACTUATOR

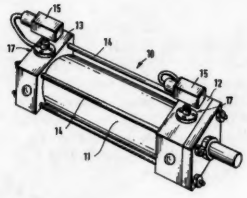
Wolfgang Dondorf, Marienheide-Dannenberg, Fed. Rep. of Germany, assignor to Pulsotronic Merten GmbH & Co. KG, Gummersbach, Fed. Rep. of Germany

Filed Jun. 17, 1988, Ser. No. 208,257

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 87109271

Int. Cl.[4] G08B *21/00*; G01L *9/00*; H01H *35/38*

U.S. Cl. 340—686 **9 Claims**



1. A device for detecting the position of a movable part of a fluid-operated actuator having an actuator wall including a bore therein, the device comprising:

a holder configured to be secured to the wall of the actuator so that the holder encompasses the bore of the wall, the holder having a cylindrical channel,

a cylindrical probe projecting from the holder and configured for introduction into the bore, the probe having a detector for detecting the movable part,

guide means for displaceably guiding the probe in the cylindrical channel of the holder,

first sealing means for establishing a seal between the holder and the wall,

second sealing means for establishing a seal between the holder and the probe,

a hollow shaft extending from the probe, and

adjustment means for axially adjusting the relative position of the hollow shaft and the holder,

whereby the length of projection of the probe from the holder is adjustable.

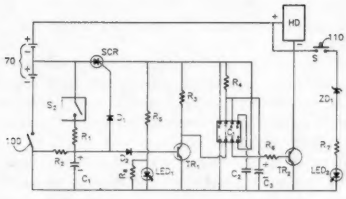
4,876,532
VENDING RACK BURGLAR ALARM

Charles L. Sauls, Rockingham, N.C., assignor to Fisher/Sauls Electronics, Inc., Rockingham, N.C.

Filed Jun. 23, 1988, Ser. No. 210,752

Int. Cl.[4] G08B *13/14*

U.S. Cl. 340—689 **14 Claims**



1. A vending machine, such as a newspaper vending rack, which is protected from theft or pilferage comprising, in combination

a housing,

a vending compartment provided in said housing for receiving and storing the articles to be vended by the machine,

an enclosed locking coin compartment carried by said housing,

a coin receiving mechanism located within said coin compartment,

an audible alarm, and

means located within said enclosed locking coin compartment for sounding said audible alarm in response to movement of said housing beyond a predetermined limited range of movement occurring for a predetermined time duration.

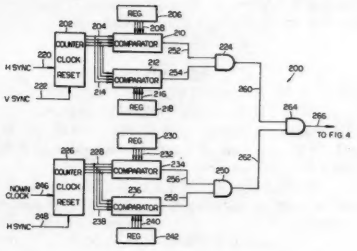
4,876,533
METHOD AND APPARATUS FOR REMOVING AN IMAGE FROM A WINDOW OF A DISPLAY

Anthony C. Barkans, Woburn, Mass., assignor to Schlumberger Technology Corporation, Houston, Tex.

Continuation of Ser. No. 915,502, Oct. 6, 1986, abandoned. This application Oct. 18, 1988, Ser. No. 259,474

Int. Cl.[4] G09G *1/06*

U.S. Cl. 340—721 **20 Claims**



1. A method for removing an image from a selected area of a scanned display device driven by a video generator and replacing said image with a predetermined background color comprising the steps of:

(a) identifying the boundary locations of said selected area on a display to within a pixel independent of said video generator driving said display;

(b) determining the current position of the scan to within a pixel on the display device;

(c) comparing said current position of said scan to said boundary locations to determine whether said current position of said scan is inside said selected area; and

(d) generating a forcing signal for said video generator to drive said display to said preselected background color when said scan is within said selected area.

4,876,534
SCANNING METHOD AND APPARATUS FOR CURRENT SIGNALS HAVING LARGE DYNAMIC RANGE

Carver A. Mead, San Jose, and Timothy P. Allen, Mountain View, both of Calif., assignors to Synaptics Incorporated, San Jose, Calif.

Filed Feb. 5, 1988, Ser. No. 152,894

Int. Cl.[4] H04N *3/12, 9/07*

U.S. Cl. 340—825.950 **33 Claims**

1. An apparatus for reading a current signal from a source in an array of sources, each current having a changeable sign, a small amplitude and several orders of magnitude dynamic range comprising:

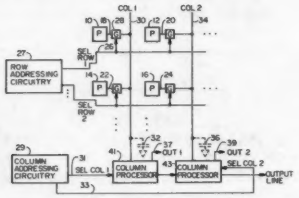
a first conductor;

a second conductor means for carrying a first addressing signal;

coupling means for coupling said current signal to said first conductor upon receipt of said first addressing signal;

an output node;

compression means having an input for coupling to a source of a reference voltage and coupled to said current signal only through said first conductor and coupled to said output node for converting said current signal to an output signal at said output node by a transfer function relating the voltage difference between the voltage at said output node and said reference voltage to said current signal such that said current signal increases faster than linearly in the positive direction for positive voltage differences and increases faster than linearly in the negative direction for negative voltage differences.



4,876,535

METHOD AND APPARATUS FOR NON-CONTACTING INFORMATION TRANSMISSION

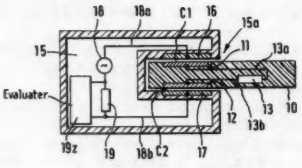
Horst Ballmer, Heidenheim, and Rudolf Grosskopf, Konigsbronn, both of Fed. Rep. of Germany, assignors to Zeiss Ikon AG, Fed. Rep. of Germany

Filed Sep. 8, 1987, Ser. No. 93,717

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1986, 3630456

Int. Cl.[4] G06K *7/08, 9/00*

U.S. Cl. 340—825.340 **7 Claims**



1. An apparatus for non-contacting information transmission between a data carrier and a data reader which are locationally independent of one another and are brought together for information transmission, comprising:

at least two planar electrodes provided at a surface of the data carrier;

at least two planar electrodes in the data reader which are brought together with said at least two planar electrodes of the data carrier to form capacitors for information transmission by producing at least one common circuit for the data carrier and the data reader;

at least one coding resistor having a predetermined resistance value connected between said at least two electrodes of the data carrier, said predetermined resistance value of said at least one coding resistor corresponding to the information for transmission;

an oscillator in the data reader having outputs connected to said at least two electrodes of the data reader;

a precision resistor connected between said oscillator and at least one of said at least two electrodes of the data reader; and

an evaluation means connected to said precision resistor for evaluating the information corresponding to said predetermined resistance value by a voltage drop across said precision resistor.

4,876,536

PAGING RECEIVER WITH A LIGHT EMITTING ELEMENT FLASHING CIRCUIT

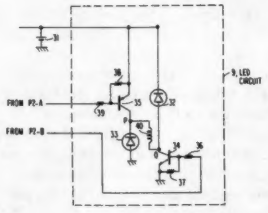
Masahiro Matai, and Kazuyuki Tsunoda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,837

Claims priority, application Japan, Oct. 12, 1987, 62-254566

Int. Cl.[4] G08B *5/38;* **H04Q** *7/02*

U.S. Cl. 340—825.440 **12 Claims**



9. A small-size receive comprising:

DC power supply means;

a coil element;

receiving means for receiving signals to produce a first and a second receive signal;

flashing circuit means including a first light emitting element which is connected at a first terminal to said DC power supply means and connected at a second terminal to a first end of said coil element such that said first light emitting element is opposite to a voltage applied from said DC power source with respect to a direction;

a second light emitting element connected at a third terminal to a second end of said coil element and at a fourth terminal to ground such that said second light emitting element is identical with said first light emitting element with respect to direction;

first switching means connected between said second terminal and ground, said first switching means repetitively turning on and off in response to a first control signal and continuously turning on in response to a second control signal;

second switching means connected between said third terminal and said power supply means, said second switching means repetitively turning on and off in response to a third control signal and continuously turning on in response to a fourth control signal; and

control means for producing, in response to said first receive signal, said second and third control signals, and for supplying said second and third control signals to said first and second switching means, respectively, said control means further producing, in response to said second receive signal, said first and fourth control signals, and for supplying said first and fourth control signals to said first and second switching means, respectively.

4,876,537

PAGER RECEIVER INCLUDING A LIGHT EMITTING AND A LIGHT SENSING ELEMENT ADJACENT TO A TRANSLUCENT PORTION OF A RECEIVER HOUSING

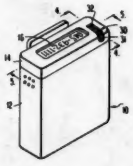
Takashi Oyamada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,274

Claims priority, application Japan, Dec. 25, 1986, 61-201950[U]; Dec. 25, 1986, 61-201951[U]

Int. Cl.[4] H04B *5/04*

U.S. Cl. 340—825.44 **7 Claims**



1. In a pager receiver comprising, in a housing having a display panel and a translucent portion, a light emitting element for indicating reception of a call, a light sensing element for sensing an illuminance at said translucent portion to produce a control signal representative of said illuminance, and an illuminating element for illuminating said display panel when the illuminance represented by said control signal is below a threshold value, the improvement wherein said light emitting element is disposed adjacent to said translucent portion such that said translucent portion is shared by said light sensing and light emitting elements.

4,876,538

PAGING SYSTEM SUBLOCAL SWITCH

Andrew A. Andros, Spring, Tex.; Thomas J. Campana, Jr., Chicago, Ill.; Gary F. Thelen, Chicago, Ill., and Robert A. Kinast, Chicago, Ill., assignors to Telefind Corp., Miami, Fla.

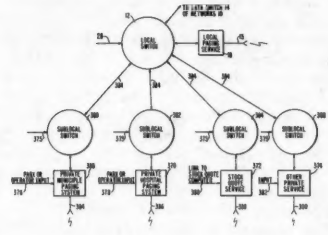
Filed Feb. 22, 1988, Ser. No. 158,950

Int. Cl.[4] H04Q *7/00*

U.S. Cl. 340—825.260 **32 Claims**

MICROFICHE APPENDIX INCLUDED

(3 Microfiche, 267 Pages)



1. In a paging network having a plurality of switches which are located in separate geographic locations with the switches including at least one local switch which is coupled to a local paging service which broadcasts pages on a radio common carrier channel for reception in a local region and at least one sublocal switch, each sublocal switch being coupled to the local switch and to a non-common carrier sublocal paging service which broadcasts pages on at least one non-common carrier channel or to a non-common carrier sublocal paging system which broadcasts pages on at least one non-common carrier channel, a request for placing a page including an identification number of a paging receiver to receive a page specified by the request, the sublocal switch comprising:

(a) an input for receiving requests for placing a page;

(b) a sublocal memory storing subscriber files of subscribers of the sublocal paging service or sublocal paging system, each subscriber file containing a subscriber identification number identifying the subscriber of the sublocal paging service or sublocal paging system and a service option field specifying any type of paging service to be provided to the subscriber of the sublocal paging service or sublocal paging system;

(c) an output for transmitting pages to the local switch; and

(d) processing means, coupled to the input, the output and the sublocal memory, which in response to each received request for placing a page compares the identification number received with the request for placing a page with the subscriber files in the memory to match the identification number received with the request for placing A page with a subscriber identification number identifying the subscriber and upon finding a match causes a page specified by the request for placing a page to be transmitted to the local switch for broadcast by the local paging service if local service is specified in the service option field and to the sublocal paging service for broadcast by the sublocal paging service or to the sublocal paging system for broadcast by the sublocal paging system if sublocal service is specified in the service option field.

4,876,539

PARAMETER TELEMETERING FROM THE BOTTOM OF A DEEP BOREHOLE

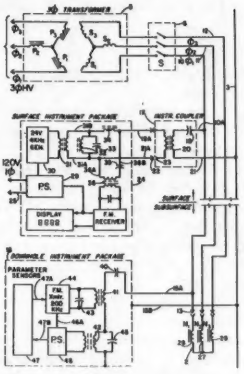
Claude A. Farque, Tulsa, Okla., assignor to Oil Dynamics, Inc., Tulsa, Okla.

Continuation of Ser. No. 866,896, May 27, 1986, Pat. No. 4,788,545, which is a continuation-in-part of Ser. No. 523,455, Aug. 15, 1983, Pat. No. 4,620,189. This application Oct. 14, 1988, Ser. No. 216,279

The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.

Int. Cl.[4] G01V *1/00*; E21B *29/02*

U.S. Cl. 340—856 **4 Claims**



1. In a submersible pump installation having a power cable for delivering AC power from a power source at the surface through a multiple conductor cable to an AC motor located in a well, a separate ground conductor means formed as a part of the pump installation extending from the surface to a selected depth in the well, measuring means for monitoring at the surface at least one physical parameter in the environment of the motor, comprising in combination:

a downhole assembly located in the well in the vicinity of

the motor and having a transmitter means for generating a carrier signal independent of said AC power and for superimposing the carrier signal onto a circuit which includes one conductor in said multiple conductor cable and the ground;

sensing means in the downhole assembly for providing an electrical signal corresponding to the magnitude of said at least one physical parameter;

modulating means in the downhole assembly for modulating the carrier signal with the electrical response, and providing a modulated signal to the circuit defined by said one conductor and the ground conductor means that corresponds to the physical parameter; and

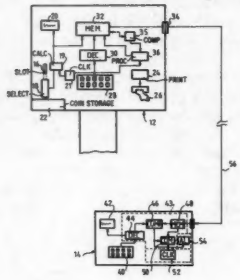
conversion means in a surface unit for converting the modulated signal into a readout signal proportional to the physical parameter.

4,876,540

SYSTEM FOR CONTROLLING METERED PARKING

Patrick Berthon, Besancon, and Christian Guion, Verrieres Le Buisson, both of France, assignors to Flonic, Montrouge, France

Continuation of Ser. No. 870,554, Jun. 4, 1986, abandoned. This application Aug. 22, 1988, Ser. No. 235,785
Claims priority, application France, Jun. 7, 1985, 85 08608
Int. Cl.[4] G08G *1/00*
U.S. Cl. 340—932.2 **36 Claims**



1. A system for controlled metered parking of road vehicles, the system comprising:

a parking meter for controlling a plurality of parking spaces, said meter comprising means accessible to drivers for entering vehicle identity data, means for computing a parking time limit associated with said vehicle identity data as a function of an amount of money prepaid by said drivers, means for storing a plurality of pairs of data items where a first data item of each of said pairs is a particular vehicle identity data item and a second data item of each said pairs is a parking time limit data item associated with said vehicle identity data item, and a first clock for delivering data corresponding to the present time; and

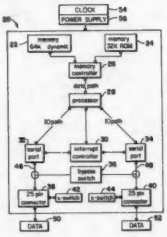
a portable terminal for use by a checker of said controlled metered parking, said terminal including means accessible to said checker for entering identification data corresponding to a vehicle parked at a particular one of said parking spaces, a second clock for providing data corresponding to the present time, means for comparing said identification data entered into said portable terminal with said vehicle identity data stored in said parking meter, means for comparing said stored parking time limit data with the present time as delivered by said second clock, and means for processing the results of said comparisons in order to cause a warning signal to appear at said terminal when said stored parking time limit data item corresponding to said parked vehicle has expired.

4,876,541

STEM FOR DYNAMICALLY COMPRESSING AND DECOMPRESSING ELECTRONIC DATA

James A. Storer, Lincoln, Mass., assignor to Data Compression Corporation, Lexington, Mass.

Filed Oct. 15, 1987, Ser. No. 108,929
Int. Cl.[4] H03M *7/42*
U.S. Cl. 341—51 **55 Claims**



1. An apparatus for dynamically compressing and decompressing an input stream of data characters into a compressed stream code and for decompressing said compressed stream of code into uncompressed data characters, the apparatus comprising:

first dictionary means for storing a first plurality of strings of data characters, said first dictionary means comprising a plurality of unique codes each for identifying a corresponding respective one of said first plurality of strings, wherein said first plurality of strings comprises an initial set of unique data characters, with each character in said initial set being positioned in a corresponding respective one of said first plurality of strings;

second dictionary means for storing a second plurality of strings of data characters, said second dictionary means comprising a plurality of unique codes each for identifying a corresponding respective one of said second plurality of strings, wherein said second plurality of strings comprises an initial set of unique data characters that is identical to said initial set of unique data characters in said first plurality of strings, with each character in said initial set in said second plurality of strings being positioned in the one of said second plurality of strings that is identified by the same unique code as the string in said first plurality of strings in which the identical character from said initial set of characters in said first plurality of strings is positioned;

first match means for receiving and parsing said input stream of data characters into parsed strings of data characters and for comparing each of said parsed strings of data characters with said first plurality of strings so as to locate the one of said first plurality of strings that matches a corresponding one of said parsed strings, wherein the most recently matched one of said parsed strings is identified as the current match;

first transmitting means for transmitting the one of said plurality of unique codes identifying the one of said first plurality of stored strings that matches said current match, for each current match;

second match means for receiving said one unique code transmitted by said first transmitting means for each current match, and for comparing each said one unique code with said plurality of unique codes identifying said second plurality of strings so as to locate the one of said plurality of unique codes in said second dictionary means that matches said each said one unique code received from said first transmitting means;

second transmitting means for transmitting the string of character data in said second plurality of strings identified by the one of said plurality of unique codes in said second

dictionary means that matches said one unique code received from said first transmitting means, for each string of character data matched by said second match means;

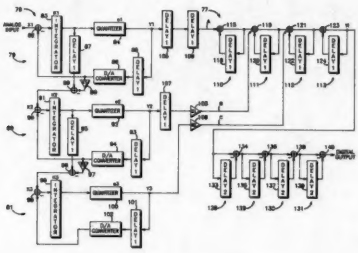
first update means for adding N new strings of data characters to said first dictionary means for each current match, wherein N equals the number of characters in said current match, said N new strings comprising the last current match concatenated with each non-empty prefix of said current match, and including means for assigning one of said plurality of unique codes to each of said new strings; and

second update means for adding said N new strings of data characters to said second dictionary means for each current match, including means for assigning the same one of said plurality of unique codes to each of said N new strings added to said second dictionary means that is assigned to corresponding respective ones of said N new strings added to said first dictionary means.

4,876,542
MULTIPLE OUTPUT OVERSAMPLING A/D CONVERTER WITH EACH OUTPUT CONTAINING DATA AND NOISE

Nicholas van Bavel, and Tim A. Williams, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 25, 1988, Ser. No. 147,958
Int. Cl.[4] H03M *3/02*
U.S. Cl. 341—143 **10 Claims**



1. A data conversion system having a multiple output oversampling A/D converter for operating at a sampling frequency and having an input terminal for receiving an analog input signal and a plurality of output terminals for providing a plurality of output signals, each output signal containing data and noise, comprising;

a rank ordered plurality of quantization loops equal in number to the plurality of output terminals, each loop separately comprising:

an integrator for integrating a difference between an input terminal signal and a feedback signal;

a quantizer for quantizing an output from the integrator and providing one of the output signals at a predetermined one of the plurality of output terminals, each of the output signals providing a predetermined amount of data and noise; and

means for converting the output signal from the quantizer to the feedback signal,

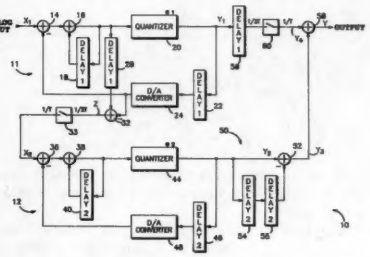
the highest ranked quantization loop receiving the input signal as the input terminal signal, and the remaining quantization loops receiving the input terminal signal from an immediately higher ranked loop, all the loops except the lowest ranked loop further comprising coupling means for providing the input terminal signal to the immediately lower ranked loop; and

filter means having a plurality of input terminals, each of the input terminals being coupled to a predetermined one of the plurality of output terminals, said filter means using the data of each of the plurality of output signals without individually differentiating each data output by a predetermined power of (1—D), where D is a predetermined delay, before filtering to provide a digital equivalent of predetermined bit width of the analog input signal.

4,876,543
MULTI-RATE CASCADED NOISE SHAPING MODULATOR

Nicholas R. van Bavel, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 31, 1988, Ser. No. 200,475
Int. Cl.[4] H03M *3/00*
U.S. Cl. 34.1—143 **9 Claims**



1. A multi-rate cascaded noise shaping modulator operating at a plurality of sampling frequencies, each greater than an input signal frequency, said modulator having an input for receiving an analog input signal and an output for providing an equivalent digital output signal, comprising:

at least first and second quantization loops, each quantization loop comprising:

means for filtering a difference between an input terminal signal and a feedback signal;

a quantizer for quantizing an output from an integrator and providing a loop output signal; and

feedback means having an input coupled to the loop output signal and an output for providing the feedback signal;

said first quantization loop operating at a first sampling frequency and said second quantization loop operating at a second sampling frequency which is higher than the first sampling frequency.

4,876,544
OVERSAMPLING A/D CONVERTER COMPRISING AN ADDITIONAL CAPACITOR SWITCHED IN SYNCHRONISM WITH SWITCHIN OF AN INPUT CAPACITOR

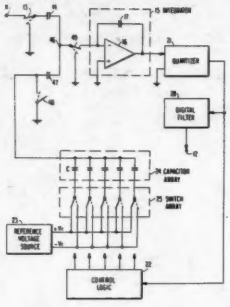
Yoshiaki Kuraishi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,458
Claims priority, application Japan, Apr. 10, 1987, 62-88232
Int. Cl.[4] H03M *1/50*
U.S. Cl. 341—166 **3 Claims**

1. In an oversampling analog-to-digital converter having a converter input terminal supplied with an input analog signal, and comprising an input switched capacitor connected to said input terminal for sampling said analog signal into output electric charges, an integrator for integrating input electric charges into an integrated signal, a quantizer for quantizing said integrated signal into an output digital signal, a control logic responsive to said digital signal for producing a predetermined number of control signals, a reference voltage source, a capacitor array coupled to said reference voltage source and responsive to said control signals for producing controlled electric charges, and combining means connected to said input

switched capacitor, said capacitor array, and said integrator for combining said output electric charges and said controlled electric charges into said input electric charges, the improvement wherein said combining means comprises:

an additional switched capacitor connected to said capacitor array for sampling in cooperation with said capacitor



array said controlled electric charges into additional electric charges in synchronism with sampling of said analog signal; and

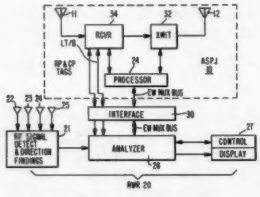
summing means connected to said input switched capacitor, said additional switched capacitor, and said integrator for summing said output electric charges and said additional electric charges into said input electric charges.

4,876,545

ADAPTIVE BLANKING INTERFACE APPARATUS FOR SELF-PROTECTION JAMMING EQUIPMENT EMPLOYED IN CONJUNCTION WITH RADAR SYSTEMS

Christopher M. Carlson, Denville, and Nicholas Deninno, Mahwah, both of N.J., assignors to ITT Corporation, New York, N.Y.

Filed Dec. 24, 1987, Ser. No. 137,854
Int. Cl.[4] H04K *3/00*
U.S. Cl. 342—14 **18 Claims**



1. In an electronic countermeasures (ECM) system of the type employing a jamming apparatus including a transmitter portion for transmitting jamming signals in order to deceive a foreign transmitter/receiving apparatus and including a warning receiver means operative to receive foreign or threat transmissions to determine the nature of such transmissions and to inform said jamming apparatus of the nature of such threat transmissions, with said warning receiver means capable of operating according to different modes in order to determine the nature of said foreign transmissions, the combination therewith of apparatus for providing selective blanking to said jamming apparatus according to the modes of operation of said receiver means to allow said receiver means and said jamming means to operate without interference between the same, comprising:

interface means coupled between said jamming apparatus and said receiver means and adapted to exchange information between said jamming apparatus and said receiver means to generate optimum blanking parameter information between said jamming apparatus and said receiver means according to the mode of operation of said receiver means whereby any one of said modes can be accommodated by said ECM system according to said information exchanged, said interface means including

a first data bus coupled between said jamming apparatus and said receiver means and adapted to propagate a series of command codes determined according to the mode of operation of said receiver means and indicative of said information exchange according to said series of command codes,

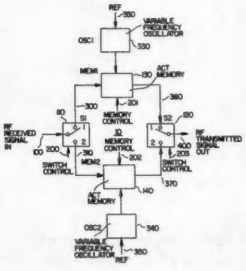
a second data bus coupled between said jamming apparatus and said receiver means and adapted to propagate code assignment messages defining a frequency range of operation to said receiver means to determine said blanking parameter information according to one of said command codes on said first bus indicative of said information exchange according to said code assignment messages.

4,876,546

DOPPLER SHIFT GENERATOR APPARATUS

Charles B. Koerner, Port Murray, N.J., assignor to ITT Corporation, New York, N.Y.

Filed Oct. 11, 1988, Ser. No. 255,938
Int. Cl.[4] G01S *7/38*
U.S. Cl. 342—15 **20 Claims**



1. A doppler shift generator apparatus for providing a predetermined Doppler shift to an incoming received RF signal as generated by a Doppler tracking radar to provide an output RF signal for transmission having said Doppler shift with said output signal providing false information to a tracking radar, comprising:

first and second analog memories, each having an input for receiving analog data at a first rate to be stored in said memories and an output for outputting the stored analog data,

clock control means coupled to said first and second analog memories for controlling the outputting of stored analog data therefrom at a second rate different from the first rate,

first switching means responsive to said received RF signal coupled to said inputs of said first and second memories and operative to select either said input of said first or second memory for applying said RF signal thereto,

second switching means coupled to said outputs of said first and second memories and operative to apply either output of said first or second memory to an output terminal indicative of said output RF signal, and

control means coupled to said first and second switching means and operative in conjunction with said first and second analog memories and said clock control means for

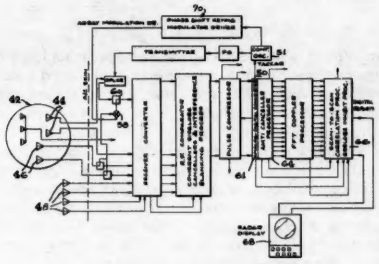
selectively applying said received RF signal to said first and second memories to store said signal in said first and second memories at the first rate and for outputting said stored signals at the second rate to provide said output RF signal with a Doppler shift relatively equal to the difference between said first and second rates.

4,876,547

M.T.I. RADAR SYSTEM

Maurice Franco, Granada Hills, Calif., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Sep. 13, 1988, Ser. No. 243,755
Int. Cl.[4] G01S *13/52*
U.S. Cl. 342—160 **15 Claims**



1. A radar system comprising:

a main directional antenna, having maximum response in a mainlobe direction, and lesser levels of response from sidelobe directions;

radar system means for transmitting pulses from said main directional antenna, and for receiving reflected signals back from moving targets and clutter from stationary objects, from said antenna;

said radar system including a coherent local oscillator, and circuit means for driving said oscillator to maintain the ground clutter returns received from the mainlobe, spread about the pulse repetition frequency lines representing zero doppler shift; said circuit means affecting sidelobe returns from fixed objects so that they appear to be moving targets;

said system including auxiliary antenna elements for receiving signals from said sidelobe directions;

means for modulating signals received from said sibelobe directions from said auxiliary antenna elements, to the exclusion of signals received from the mainlobe direction;

said radar system including target data processing circuitry;

a delay circuit and a signal inhibit circuit coupling said directional antenna to said target data processing circuitry;

pulse sampling circuitry for identifying the presence of modulated return signals from fixed objects in the sidelobe directions; and

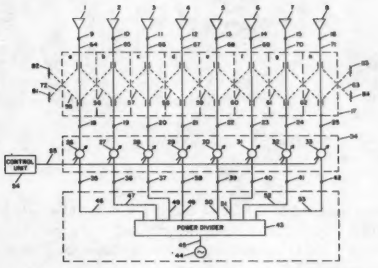
means for actuating said signal inhibit circuit to block delayed pulse signals from said directional antenna when said modulated signals are detected by said pulse sampling circuitry to eliminate false target signals received on said main directional antenna from side lobe returns.

4,876,548

PHASED ARRAY ANTENNA WITH COUPLERS IN SPATIAL FILTER ARRANGEMENT

Alfred R. Lopez, Commack, N.Y., assignor to Hazeltine Corp., Greenlawn, N.Y.

Filed Dec. 19, 1986, Ser. No. 943,419
Int. Cl.[4] H01Q *3/22*
U.S. Cl. 342—368 **15 Claims**



1. An antenna system for radiating wave energy signals into a selected angular region of space and in a desired radiation pattern, comprising:

special filter means, having N input ports and N corresponding output ports, where N is a number greater than five, comprising a network of couples for coupling signals from each of said input ports to its corresponding output port and to at least two other output ports on at least one side of said corresponding port and with the same phase;

an aperture comprising a plurality of N antenna elements arranged along a predetermined path, each element coupled to only one output port of the special filter means;

beam sterring means for controlling the direction of said radiation pattern, said means comprising N phase shifters. Each phase shifter having a phase shifter input port and a phase shifter output port which output port is coupled to only one input port of said special filter means; and

supply means for supplying wave energy signals, said supply means including a signal generator supplying a power divider having N signal output ports, each output port coupled to only one phase shifter;

whereby when wave energy signals are supplied by the signal generator through the power divider, signals supplied by a signal output port of the power divide are coupled to the antenna element associated with said output port and to a least two adjacent antenna elements on at least one side of the antenna element associated with said output port, to cause said aperture to radiate said desired radiation pattern primarily within said selected region of space without grating lobes.

4,876,549

DISCRETE FOURIER TRANSFORM DIRECTION FINDING APPARATUS

Michael S. Masheff, St. Petersburg, Fla., assignor to E-Systems, Inc., Dallas, Tex.

Filed Mar. 7, 1988, Ser. No. 165,003
Int. Cl.[4] G01S *5/02, 13/00*
U.S. Cl. 342—417 **8 Claims**

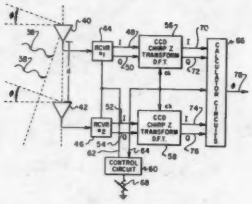
1. A circuit for finding the direction of an RF signal received on two antennae separated by a known distance "d" comprising:

an RF signal receiver coupled to each antenna for receiving the antenna signals and generating orthogonal I and Q baseband signal outputs

a CCD Chirp-Z Discrete Fourier transform circuit coupled to each receiver for receiving, sampling and separating

said I and Q baseband signals into components by frequency and amplitude,

a control circuit coupled to said CCD Chirp-Z Discrete Fourier transform circuit for controlling the sampling rate at which the I and Q signal components are sampled and separated to adjust frequency resolution, and



means coupled to the CCD Chirp-Z Discrete Fourier transform circuit for utilizing the sampled and separated baseband I and Q signal components to obtain the direction of propagation of the RF signal.

4,876,550

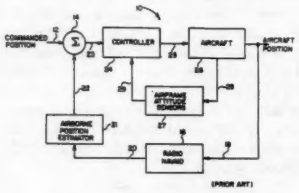
RIDGE REGRESSION SIGNAL PROCESSING FOR POSITION-FIX NAVIGATION SYSTEMS

Robert J. Kelly, Baltimore, Md., assignor to Allied-Signal Inc., Morris Township, Mooris County, N.J.

Filed Oct. 8, 1987, Ser. No. 107,430

Int. Cl.[4] G01S *3/02*

U.S. Cl. 342—451 **13 Claims**



1. Apparatus for determining the position and velocity of a moving platform comprising:

a radio navigation aid having at least three portions, two of which are distant from said platform and having a known position for providing to said platform a plurality of samples indicative of the position of said platform at respective times,

a position estimator for receiving said plurality of samples for generating an estimate of position and velocity both with an unbiased estimator wherein the mean square error of the estimate is the variance and with a biased estimator and selecting said estimate of position and velocity from said biased estimator at times said geometry of said moving platform is substantially co-linear with said two distant portions of said radio navigation aid.

4,876,551

APPARATUS FOR THE DETECTION OF AN ELECTROMAGNETIC PULSE, MORE PARTICULARLY DUE TO A NUCLEAR EXPLOSION

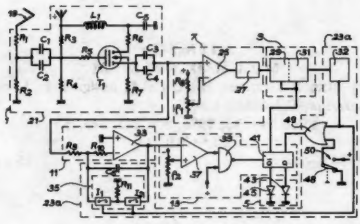
Jean-Pierre Climent, St. Germain les Corbeil; Georges Petelet, Escurolles, and Jean-Claude Tronel, Bretigny sur Orge, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 26, 1987, Ser. No. 66,760

Claims priority, application France, Jun. 26, 1986, 86 09294

Int. Cl.[4] G01S *3/02*

U.S. Cl. 342—460 **12 Claims**



1. An apparatus for detecting and for discriminating a first electromagnetic pulse due to a nuclear explosion from a second electromagnetic pulse due to another source, comprising at least one detection unit including:

(a) sensing means fixed on the ground for sensing the electrical component of an electromagnetic pulse emanating from a nuclear explosion regardless of the orientation of said fixed sensing means relative to said nuclear explosion, said fixed sensing means supplying an electric signal representative of the polarization of the sensed electrical component of the electromagnetic pulse and being proportional to the sensed electrical component,

(b) first detection means connected via an impedance matching device to the fixed sensing means for detecting the passage of the electric signal supplied by the fixed sensing means at a value higher than a predetermined threshold value,

(c) a first time counter connected to and started by the first detection means during the detection of the passage of the electric signal at a value higher than the threshold value,

(d) integration means connected to the fixed sensing means for integrating the electric signal supplied by the fixed sensing means, and

(e) first comparison means connected to the integration means and to the first time counter, for comparing the value of the electric signal integrated up to a time t_1 after the starting of the first time counter with a first reference value.

4,876,552

INTERNALLY MOUNTED BROADBAND ANTENNA

Zdravko M. Zakman, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 27, 1988, Ser. No. 186,545

Int. Cl.[4] H01Q *1/24;* H04B *1/40*

U.S. Cl. 343—702 **8 Claims**

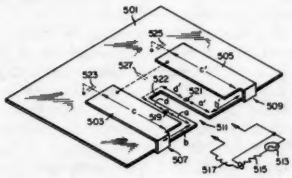
1. A broadband reactive ground feed antenna comprising:

a conductive surface having a notch extending from a first edge of said conductive surface toward a second edge of said conductive surface thereby dividing said conductive surface into first and second portions about a center line of said notch;

a two-point antenna feed coupled to said first and second portions and disposed on symmetrically opposite sides of said notch thereby creating a reactive ground feed;

a first resonator comprising a microstrip transmission line

coupled to said reactive ground feed, said first resonator microstrip transmission line having first and second ends and coupled at said first end to said first edge of said first portion, and



a second resonator comprising a microstrip transmission line coupled to said reactive ground feed, said second resonator microstrip transmission line having first and second ends and coupled at said first end to said first edge of said second portion.

4,876,553

APPARATUS FOR ADJUSTING THE POLARIZATION PLANE OF AN ANTENNA

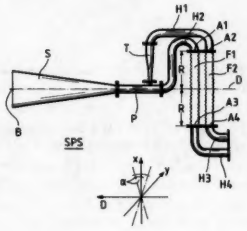
Norbert Nathrath, Taufkirchen, and Dietmar Fasold, Zorneding, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Nov. 30, 1988, Ser. No. 277,878

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1987, 3740651

Int. Cl.[4] H01Q *13/02, 3/12*

U.S. Cl. 343—756 **1 Claim**



1. Apparatus for rotatably adjusting the polarization plane in an antenna feed system, the feed system having an axis of rotation, comprising:

rotatable feed horn means having a main beam direction coincident with the axis of rotation of the feed system;

orthogonal mode transducer means coupled to the feed horn means;

at least two movable feeding waveguide means coupled to the orthogonal mode transducer means, the feeding waveguide means having at least two moving flange means aligned in the same plane in close proximity to one another, and arranged at an equal distance from the axis of rotation of the feed system;

at least two fixed relaying waveguide means arranged at the same distance from the axis of rotation as the movable feeding waveguide means, the fixed relaying waveguide means having fixed flange means aligned in the same plane, the fixed flange means being in close proximity to one another, said two fixed relaying waveguide means being arranged along an axis of symmetry of the feed system which is substantially disposed perpendicular to said axis of rotation; and

flexible waveguide means coupled respectively to the fixed and moving flange means, the flexible waveguide means being capable of rotation through angles of $\pm\alpha$ on either side of said axis of symmetry.

4,876,554

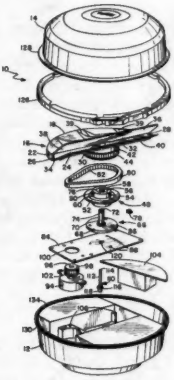
PILLBOX ANTENNA AND ANTENNA ASSEMBLY

Duane G. Tubbs, La Mesa, Calif., assignor to Qualcomm, Inc., San Diego, Calif.

Filed Jan. 19, 1988, Ser. No. 145,790

Int. Cl.[4] H01Q *13/00*

U.S. Cl. 343—780 **17 Claims**



1. A directive communications antenna comprising:

a substantially parabolic upper plate having a leading edge;

a substantially parabolic lower plate having a leading edge;

a parabolic reflecting cylinder, having a pair of leading edges, disposed between and axially intersecting said plates so as to form an antenna cavity having a focus line and an antenna focus located on said focus line within said cavity, said upper and lower plate leading edges and said parabolic reflecting cylinder leading edges aligned along a common plane defining a cavity aperture thereat;

an upper lip plate extending along said upper plate leading edge and projecting upwardly therefrom at a first predetermined angle with respect to a plane defined by said lower plate;

a lower lip plate extending along said lower plate leading edge and projecting upwardly therefrom at a second predetermined angle with respect to said plane; and

electromagnetic feed means disposed along said focus line within said cavity, comprising;

a. a waveguide feed probe extending through a hole in said lower plate into said cavity at a point along said focus line; and

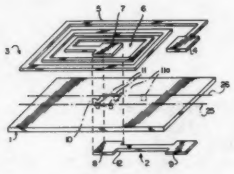
b. a reflector extending upwardly within said cavity from said lower plate, said reflector having a concave face facing said reflecting cylinder centered on said focus line between said probe and said lower plate leading edge at said antenna cavity focus.

4,876,555

RESONANCE LABEL AND METHOD FOR ITS FABRICATION

Paul R. J100 rgensen, Almunecar, Spain, assignor to Durgo AG, Switzerland

Filed Mar. 15, 1988, Ser. No. 168,468
Claims priority, application Switzerland, Mar. 17, 1987, 1000/87
Int. Cl.[4] G08B *13/24*; H01Q *1/38*
U.S. Cl. 343—895 24 Claims



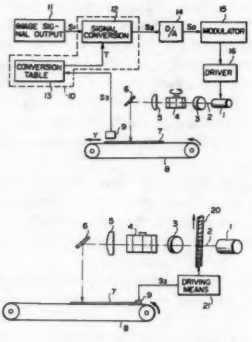
1. A deactivatable resonance label, comprising:
a dielectric layer having first and second opposed faces;
a first conducting layer on the first face of the dielectric layer, the first conducting layer being shaped to form an inductor and a first capacitor plate;
a second conducting layer on the second face of the dielectric layer, the second conducting layer being shaped to form a second capacitor plate, the first and second conducting layers being at least partially superposed, said first and second conducting layers and said dielectric layer forming together an oscillating circuit; and
shorting means for enabling creation of a short-circuit between the first and second conducting layers when it is desired to deactivate the oscillating circuit, the shorting means being comprised of at least one throughhole passing through the dielectric layer to provide a short circuit path between the first and second conducting layers.

4,876,556

BEAN RECORDER WITH A TEMPERATURE SENSOR FOR LIGHT QUANTITY CONTROL

Yuji Ohara, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 30, 1988, Ser. No. 175,430
Claims priority, application Japan, Mar. 30, 1987, 62-77323
Int. Cl.[4] G01D *15/14*; H04N *1/23*
U.S. Cl. 346—108 2 Claims



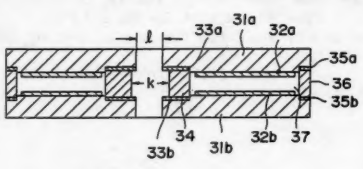
1. A light beam recording apparatus which modulates a light beam on the basis of information in an image signal and deflects the modulated light beam to scan a photosensitive recording material, thereby recording an image borne by said image information on said recording material,
characterized by having a temperature sensor for detecting the temperature of said photosensitive recording material, and a light quantity control means which controls the quantity of light in the light beam on the basis of the output of the temperature sensor,
wherein said light beam recording apparatus includes a graduation correction means in which said image signal is converted to a predetermined signal according to a conversion table, for obtaining an image density based on said image signal irrespective of the energy density-image density characteristics of said recording material,
and wherein said light quantity control means includes means for rewriting said conversion table according to temperature in said graduation correction means.

4,876,557

RECORDING MEDIUM OF AIR-SANDWICH STRUCTURE

Masao Yabe, Fujinomiya, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 914,200, Oct. 1, 1986, abandoned. This application Mar. 22, 1988, Ser. No. 172,974
Claims priority, application Japan, Oct. 2, 1985, 60-221070
Int. Cl.[4] G01D *15/24*
U.S. Cl. 346—137 10 Claims



1. In a recording medium of air-sandwich structure comprising two disc-shaped substrates opposed to each other, the two substrates having at the center a hole of the same size to each other, with a ring-shaped inner plastic spacer, a ring-shaped outer plastic spacer and a recording layer for writing and/or reading information with a laser beam interposed between the two disc-shaped substrates, wherein the recording layer is provided on the inner surface of at least one substrate,
the improvement including a recessed seat means for fitting and aligning said inner spacer between said two substrates, said recessed seat means comprised of a recessed portion formed around each said hole on each said substrate, wherein said inner spacer has an inside diameter larger than the diameters of the holes of the substrates.

4,876,558

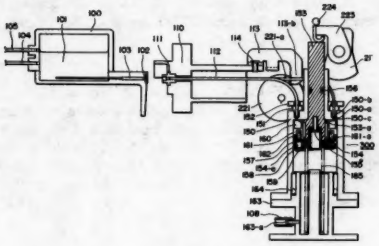
PUMP DEVICE AND AN INK JET RECORDING APPARATUS HAVING THE PUMP DEVICE

Toshiharu Mamiya, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 894,105, Aug. 7, 1986, abandoned. This application Jul. 25, 1988, Ser. No. 224,246
Claims priority, application Japan, Aug. 9, 1985, 60-175464
Int. Cl.[4] G01D *15/16*; B41J *3/04*; F04B *7/00*
U.S. Cl. 346—140 R 22 Claims

1. A pump device for use in an ink jet recording apparatus comprising a cylinder, a piston mounted for reciprocally moving within a predetermined range of movement in said cylinder to generate pressure and a liquid inlet in said cylinder, wherein;
said liquid inlet is disposed outside of the predetermined range of movement of said piston and a negative pressure is generated in said cylinder between said piston and said liquid inlet during movement of said piston;
said piston includes a sealing member biased into sealing

engagement with said liquid inlet when said piston is in a first portion of its predetermined range of movement; and said liquid inlet is sealed by said sealing member against negative pressure in said cylinder when said piston is in



the first portion of its predetermined range of movement and said liquid inlet is open to negative pressure in said cylinder when said piston is in a second portion of its predetermined range of movement.

4,876,559

RECORDING APPARATUS HAVING A PRINT PERMISSION CIRCUIT FOR PROTECTING PLURAL RECORDING HEADS DRIVEN IN ACCORDANCE WITH SELECTIVELY APPLIED PRINT SIGNALS FROM OVERLOAD

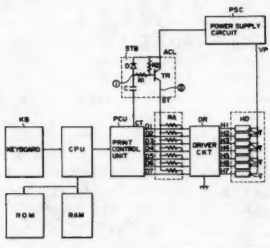
Hiroshi Nishikawa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1988, Ser. No. 165,095

Claims priority, application Japan, Mar. 13, 1987, 62-058312

Int. Cl.[4] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—140 R **6 Claims**



1. A recording apparatus comprising a keyboard for inputting data, data processing means connected to said keyboard for processing the data input from the keyboard and an output unit connected to said data processing means for outputting the data processed by said data processing means, wherein said output unit includes:

a plurality of recording heads for dot recording on a recording medium the data processed by said data processing means when said recording heads are actuated;

a like plurality of resistors, each having an end connected with a corresponding one of said recording heads;

signal generating means connected to said data processing means and to said one end of said resistors for generating output signals to be selectively supplied to each of said recording heads and for generating a control signal to control actuation of said recording heads; and

output permission means connected to said signal generating means and having a differentiating circuit for differentiating the control signal to provide an output permission signal to the other end of each said resistor to permit said plurality of recording heads to be actuated in accordance with the output signals.

4,876,560

RECORDING APPARATUS

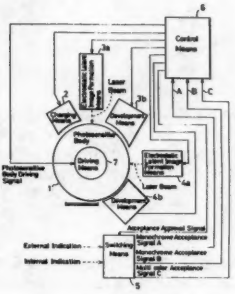
Jiro Egawa; Naruhito Yoshida; Toshihiro Kasai; Moriya Nagasawa, all of Kanagawa; Naoaki Ide, and Hironobu Machida, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 9,349, Jan. 30, 1987. This application Aug. 15, 1988, Ser. No. 232,222

Claims priority, application Japan, Jan. 31, 1986, 61-18235

Int. Cl.[4] G03G *15/00*

U.S. Cl. 346—153.1 **3 Claims**



1. An image forming apparatus for forming an image on a recording member, comprising:

means for detecting a size of the recording member;

means for forming an image in accordance with a plurality of dot signals;

means for providing a clock signal for sending the dot signals synchronous with the clock signal, whose pulse number changes according to the size of the recording member detected by said detecting means;

means for receiving the clock signal provided by said clock signal providing means; and

means for sending image signals corresponding to said dot signals to said image forming means, synchronous with said clock signal received by said clock signal receiving means.

4,876,561

PRINTING APPARATUS AND TONER/DEVELOPER DELIVERY SYSTEM THEREFOR

Fred W. Schmidlin, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 31, 1988, Ser. No. 200,277

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—159 **14 Claims**

1. Direct electrostatic printing apparatus, said apparatus comprising:

a supply of well charged toner particles;

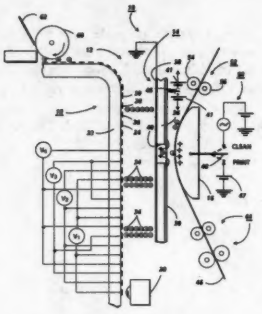
an apertured printhead structure;

an image receiving member disposed adjacent one side of said apertured printhead;

a charged toner conveyor including a plurality of spaced-apart electrodes, said charged toner conveyor being disposed adjacent said supply of well charged toner and the opposite side of said apertured printhead for moving toner particles from said supply to an area adjacent said printhead;

a source of electrical power operatively connected to said spaced-apart electrodes for creating wave energy for effecting the movement of toner particles;

said printhead being electrically biased to establish an electrostatic field thereacross; and



said apertured printhead having a thickness in the direction of toner particle movement that is relatively small to thereby maximize the field strength of said electrostatic field whereby aperture clogging is minimized.

4,876,562

IMAGE RECORDING APPARATUS

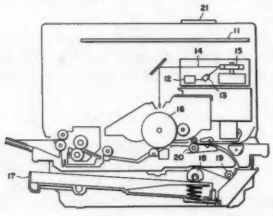
Yasuhito Suzuki, Kawasaki; Koichiro Akimoto, Yokohama; Hajime Ohshima, Tokyo; Kazuyuki Honda, and Yukio Isaka, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

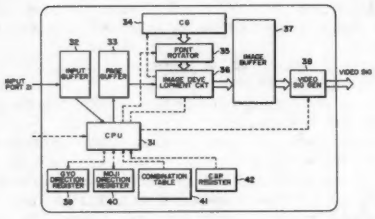
Continuation of Ser. No. 779,107, Sep. 23, 1985, abandoned. This application Feb. 21, 1989, Ser. No. 313,361

Claims priority, application Japan, Sep. 25, 1984, 59-198623; Sep. 25, 1984, 59-198624; Sep. 25, 1984, 59-198626

Int. Cl.[4] G01D *15/14*; G03G *21/00*

U.S. Cl. 346—160 **39 Claims**





1. An image recording apparatus comprising:

print data input means for inputting print data;

image forming means for forming an image on a record medium in accordance with the inputted print data; and

control means for determining a processing code of the inputted print data on the basis of inputted page direction information representing a page direction of an image to be formed and inputted print direction information representing a print direction of the image to be formed.

4,876,563

MOTOR-DRIVEN SHUTTER FOR CAMERA

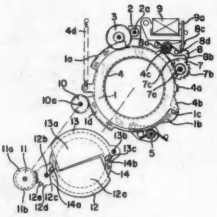
Hiroaki Ishida; Nobuo Shinozaki, and Michitake Nakazawa, all of Tokyo, Japan, assignors to Seikosha Co., Ltd., Japan

Filed Mar. 23, 1988, Ser. No. 172,078

Claims priority, application Japan, Mar. 23, 1987, 62-68354

Int. Cl.[4] G03B *3/10, 9/24, 17/00*

U.S. Cl. 354—234.1 **17 Claims**



1. A motor-driven shutter for a camera which comprises at least one barrier for covering the front surface of a lens before and after said shutter is operated and a motor for operating said shutter for the purpose of focussing, said barrier being driven by linking means which is responsive to operation of said motor.

4,876,564

DRIVE DEVICE FOR PHOTOGRAPHIC LENS

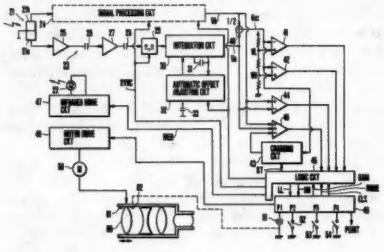
Takashi Amikura, Tokyo; Akihiro Fujiwara, Kanagawa; Masamichi Toyama, Tokyo; Kouichi Ueda, Kanagawa, and Susumu Kozuki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 195,393, May 13, 1988, abandoned, which is a continuation of Ser. No. 5,782, Jan. 21, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 289,458

Claims priority, application Japan, Jan. 23, 1986, 61-12835; Jan. 23, 1986, 61-12836; Jan. 23, 1986, 61-12837

Int. Cl.[4] G03B *3/00*

U.S. Cl. 354—400 **11 Claims**



1. A photographic apparatus operating with selection of a first interchangeable lens having a lens member movable in a prescribed range and equipped with position detector means responsive to attainment of said lens member on one of the

terminal ends of said range for producing a position signal and a second interchangeable lens equipped with no position detector means for producing the position signal, comprising:

(a) drive means for driving said movable lens means;

(b) command means for producing an actuating signal for said drive means;

(c) control means, when said first interchangeable lens is in use, responsive to said position signal for stopping the output of said command means, and when said second interchangeable lens is in use, responsive to production of said actuating signal for counting a prescribed time upon attainment to stop said actuating signal.

4,876,565

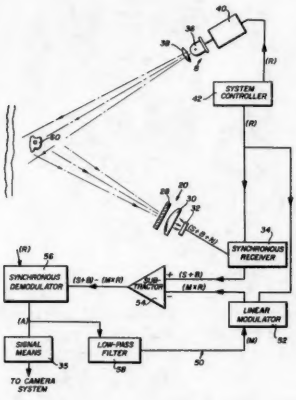
APPARATUS AND METHOD OF UNDERWATER OPTICAL RECORDING

Robert F. Tusting, Ft. Pierce, Fla., assignor to Harbor Branch Oceanographic Institution, Inc., Ft. Pierce, Fla.

Filed Oct. 24, 1988, Ser. No. 261,334

Int. Cl.[4] G03B 3/00

U.S. Cl. 354—403 **11 Claims**



1. In apparatus for underwater optical recording including a camera to record scenes in a predetermined sector forward thereof, first optical means spaced apart radially from said camera to project a divergent light beam so that it intersects said predetermined sector, receiver means to detect and measure the intensity of light provided with second optical means spaced apart radially from said camera to view a conical volume that intersects said light beam and the intersecting peripheries of said light beam and said conical volume substantially define said predetermined sector, and signal means that is activated by said receiver means when it measures an intensity of light in said predetermined sector above a predetermined minimum value, the improvement of a nulling loop in series between said receiver means and said signal means, said nulling loop comprising a synchronous linear modulator, an algebraic subtracter, a synchronous demodulator and a low-pass filter.

4,876,566

CAMERA HAVING AUTO-TRIM EXPOSURE CONTROL

Peter P. Carcia, and Judith N. Coltman, both of Reading, Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 17, 1988, Ser. No. 258,879

Int. Cl.[4] G03B 7/08

U.S. Cl. 354—436 **11 Claims**

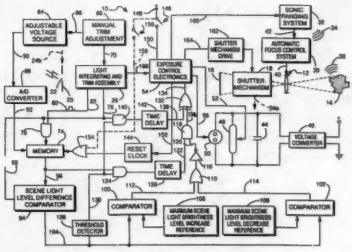
1. An exposure control system for a self-processing camera having means for defining a film plane and an optical system for directing light along an optical path from a scene onto photosensitive material located in the film plane, said exposure control system comprising:

a blade mechanism mounted for movement between a blocking arrangement in which said blade mechanism is in light blocking relation with respect to the optical path so as to preclude scene light from being transmitted along the optical path to the film plane and an unblocking arrangement in which said blade mechanism is in light unblocking relation with respect to said optical path so as to allow the passage of scene light to the film plane;

drive means for displacing said blade mechanism between its said blocking and unblocking arrangements to define an exposure interval;

first means for generating a first electrical signal representative of the magnitude of the brightness level of a scene to be photographed;

means for storing said first signal for a predetermined period of time;



second means for generating a second electrical signal representative of the difference in magnitude between said stored first signal and a scene light brightness signal generated by said first generating means subsequent to the generation of said first light signal and within said predetermined period of time;

trim control means for manually increasing or decreasing the magnitude of a scene light brightness level signal and said stored first signal over a limited range of corresponding scene light brightness levels;

third means for generating a third signal indicating that the difference in magnitude between said stored first signal and said subsequently generated scene light brightness level signal exceeds some predetermined magnitude; and

control means for actuating said drive means to effect the displacement of said blade mechanism to produce an exposure interval of a first value in the absence of generating of said third signal, and for producing an exposure interval of a second value upon the receipt of said third signal.

4,876,567

CRT PRINTING METHOD AND APPARATUS FOR MAKING A PRINT OF AN IMAGE WITH LETTERS

Kiyoshi Yamaguchi; Azuchi Endo, and Kiichiro Sakamoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 25, 1987, Ser. No. 29,921

Claims priority, application Japan, Mar. 25, 1986, 61-64895; Mar. 25, 1986, 61-64896; Apr. 1, 1986, 61-72424; Apr. 1, 1986, 61-72425; Apr. 1, 1986, 61-72426; Apr. 1, 1986, 61-72427

Int. Cl.[4] E03B 27/52

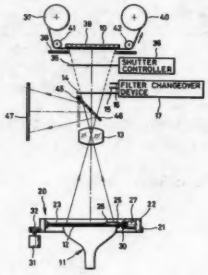
U.S. Cl. 355—20 **21 Claims**

1. An apparatus for printing compositely an image and letters on a photographic paper, which comprises:

display means having a CRT display device for displaying said image on the screen thereof;

letter bearing means provided with at least a complimentary phrase thereon which is removably disposed at least close to said screen;

adjusting means for linearly and rotationally adjusting said letter bearing means such that said complimentary phrase



can be positioned at substantially any desired location with respect to said screen; and

means for exposing said photographic paper to said CRT image on said screen and said complimentary phrase on said letter bearing means.

4,876,568

FOCUSING METHOD FOR PRINTER

Yoshio Ozawa; Takashi Yamamoto; Takao Shigaki, and Rokusaburo Kaneko, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 24, 1988, Ser. No. 210,950

Claims priority, application Japan, Jul. 10, 1987, 62-172381

Int. Cl.[4] G03B *27/34*

U.S. Cl. 355—56 **15 Claims**

1. A focusing method for a printer in which a lens is disposed between a photographic film and a printing paper, in which the conjugate distance between said photographic film and said printing paper as well as the lens position are changeable, and in which focusing is provided for printing by changing said conjugate distance and said lens position in accordance with a magnification value, comprising the steps of:

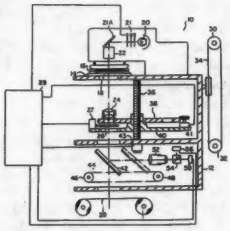
(a) calculating said lens position and said conjugate distance at a previously selected magnification value on the basis of an equation which expresses a lens position and a conjugate distance which ensures focusing in accordance with a magnification value;

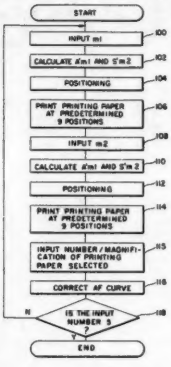
(b) changing the lens position within a predetermined range including the calculated lens position which serves as an original position, and conducting printing at each of these lens positions;

(c) selecting a lens position which provides an optimal focusing;

(d) correcting said equation using the selected lens position and the actual magnification employed when the selection is made; and

(e) calculating a lens position and a conjugate distance at an-other magnification value using the equation corrected when the selected lens position coincides with said origi-





nal position, and then changing the lens position and the conjugate distance accordingly.

4,876,569

IMAGE EXPOSURE APPARATUS

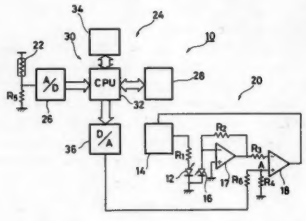
Yukitsugu Nishitoku, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 9, 1988, Ser. No. 242,459

Claims priority, application Japan, Sep. 9, 1987, 62-225580

Int. Cl.[4] G03B *27/72*

U.S. Cl. 355—68 **10 Claims**



1. An image exposure apparatus which comprises: a light source for exposing a light-sensitive material with light having a predetermined wavelength; a drive source for driving said light source; a photodetector for detecting the optical output of said light source; a comparator for comparing the detected optical output level with a reference level; a temperature detector for detecting the change in the temperature of said light

source; and control means which controls the optical output level of the light source on the basis of both the temperature change signal detected with said temperature detector and the output signal from said comparator in such a way that the exposure sensitivity of said light-sensitive material will not deteriorate in the face of the variation in the wavelength of light from said light source that occurs on account of the change in its temperature.

4,876,570

IMAGE RECORDING APPARATUS

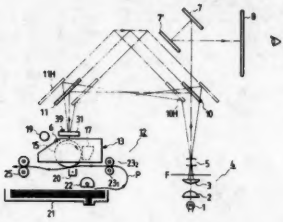
Toshio Iwaya, Shiki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 244,157

Claims priority, application Japan, Sep. 21, 1987, 62-236741; Dec. 11, 1987, 62-311841

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—204 **22 Claims**



1. An image recording apparatus for recording an image on a recording medium, comprising:

detection means for detecting an information recorded area on the recording medium;

setting means for setting a to-be-recorded area for the recording medium;

determination means for determining if the information recorded area detected by said detection means and the image area set by said setting means overlap; and

signal generating means for generating a signal when said determination means determines the overlap.

4,876,571

COPYING MACHINE HAVING A BAR CODE READER

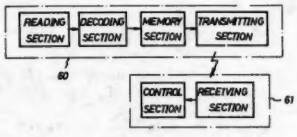
Yoko Nakamura, Kawasaki; Fumiyo Kojima, Mitaka, and Hirobumi Yoshino, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 11, 1988, Ser. No. 180,068

Claims priority, application Japan, Apr. 11, 1987, 62-87906; Apr. 11, 1987, 62-87907; Apr. 11, 1987, 62-87910; Apr. 13, 1987, 62-88777; Apr. 13, 1987, 62-88778; Apr. 13, 1987, 62-88779

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—210 **6 Claims**



4. A copying machine comprising:

a sheet fixedly attached to a surface of a main body of the copying machine, in which bar codes corresponding to various copying modes are printed;

a portable type bar code reader being separable from the main body for reading the bar codes from the sheet;

a decoding section disposed in the main body for decoding signals transmitted from said bar code reader; and

a control section disposed in the main body for setting a copying mode based on data derived from said decoding section.

4,876,572

IMAGE RECORDING HAVING A REMOVABLE IMAGE FORMING CASE

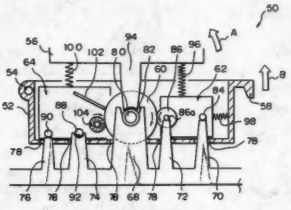
Shinji Nagatsuna, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,354

Claims priority, application Japan, Sep. 16, 1987, 62-141370[U]

Int. Cl.[4] G03G *15/00H*

U.S. Cl. 355—210 **4 Claims**



1. In an image recorder having a body which is divided into an upper and a lower unit being openable relative to each other, and an image forming case which is disposed between said upper and lower units and accommodates a photoconductive element, a developing device and a cleaning device detachably therein, the improvement wherein said lower unit comprises positioning means for positioning said photoconductive element, said developing device and said cleaning device individually, and said upper unit comprises pressing means for pressing said photoconductive element, said developing device and said cleaning unit against said lower unit so that said photoconductive element, said developing device and said cleaning device are positioned by said positioning means.

4,876,573

DEVELOPING METHOD USING NON-MAGNETIC ONE-COMPONENT TONER AND DEVELOPING UNIT THEREFOR

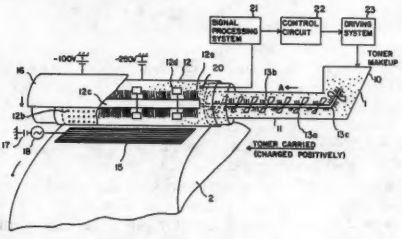
Taisuke Kamimura, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 74,874, Jul. 17, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 311,407

Claims priority, application Japan, Jul. 18, 1986, 61-170267

Int. Cl.[4] G03G *15/08, 15/06;* B05B *5/02;* B05C *5/02*

U.S. Cl. 355—250 **10 Claims**



1. A developing unit for developing an electrostatic latent image formed on a photoreceptor drum surface with non-mag-

netic, one-component toner composition comprising in combination:

a conveyor unit for transporting non-magnetic, single component toner particles therein, said conveyor unit including a fur brush means for electrically charging said toner particles by friction;

a photoreceptor drum for forming an electrostatic latent image on the surface thereof having an electrically attracting force;

a hollow cylinder connected with said conveyor unit juxtapositioned to and facing said photoreceptor drum into which said single component toner particles are conveyed, said hollow cylinder including a fur brush means therein for further charging said single component toner particles by friction and for mechanically stirring said toner particles to create a cloud-like state of said toner particles, said hollow cylinder comprising a surface portion having toner passages formed in at least that portion of said surface portion facing said photoreceptor drum surface;

means for applying a bias voltage to said hollow cylinder to assist said fur brush means in stirring said toner particles and creating said cloud-like state of said toner particles,

a screen grid mounted in a zone between said hollow cylinder and said photoreceptor drum through which said charged toner particles must pass in the development of said electrostatic latent image; and

means for applying an AC bias voltage to said screen grid to cause said toner particles to fly about after emerging from said hollow cylinder to be selectively deposited on said electrostatic latent image.

4,876,574

DEVELOPING APPARATUS

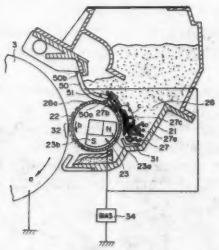
Hatsuo Tajima, Matsudo; Takahiro Kubo, Tokyo, and Hiroshi Tajika, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,810

Claims priority, application Japan, Nov. 4, 1987, 62-277346; Nov. 4, 1987, 62-277347; Nov. 4, 1987, 62-277348

Int. Cl.[4] G03G *15/08*

U.S. Cl. 355—253 **27 Claims**



1. A developing apparatus, comprising:

a rotatable member;

magnetic field generating means disposed in said rotatable member;

means for applying toner and magnetic particles on said rotatable member; and

toner layer forming means including an elastic member having a free end portion, adjacent to which it is contacted to said rotatable member and a magnetic member disposed at least adjacent the free end portion of said elastic member and disposed in a magnetic field provided by said magnetic field generating means.

4,876,575

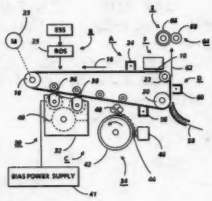
PRINTING APPARATUS INCLUDING APPARATUS AND METHOD FOR CHARGING AND METERING TONER PARTICLES

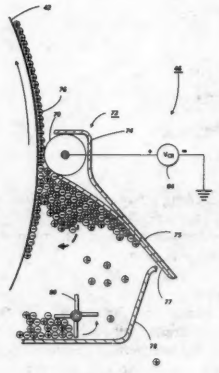
Dan A. Hays, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 31, 1988, Ser. No. 200,328

Int. Cl.[4] G03G *15/08*

U.S. Cl. 355—259 **29 Claims**





1. Apparatus for developing latent electrostatic images on a charge retentive surface with toner, said apparatus comprising:

a supply of toner;

a donor structure supported for movement in an endless path for conveying toner from said supply of toner to an area opposite said charge retentive surface;

means including a flexible rod, supported in contact with toner on said donor structure and disposed between it and said donor structure, for effecting metering and charging of said toner without being adversely affected by runout of said donor structure.

4,876,576

DEVICE FOR CHANGING SHEET SHAPE BEFORE ENTRY INTO FUSER NIP

Keiji Itaya, Yokohoma, and Hiromasa Kohayakawa, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 21, 1988, Ser. No. 184,414

Claims priority, application Japan, Apr. 25, 1987, 62-102792; Apr. 30, 1987, 62-106853

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—285 **7 Claims**

1. A fixing device for an image forming apparatus, comprising:

first and second rollers forming a nip portion therebetween,

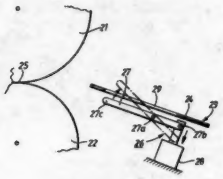
the rollers transporting an image forming medium and fixing an image thereon;

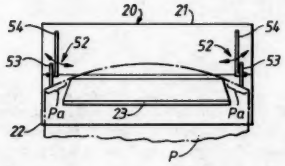
means for conveying the image forming medium having a flat shape and a leading edge approaching the nip portion; and

means for changing the shape of the leading edge of the image forming medium from the flat shape to a convex shape by thrusting against the leading edge in the vicinity of the center of the width of the image forming medium while the image forming medium approaches the nip portion.

6. A fixing device for an image forming apparatus, comprising:

first and second rollers for forming a nip portion therebe-





tween, which rollers transport an image forming medium and fix an image thereon, the image forming medium having a flat shape and having a leading edge approaching the nip portion;

means for conveying the image forming means, the conveying means including a guide plate having a predetermined width smaller than the width of the image forming medium to form portions of the image forming medium not in contact with the guide plate, the guide plate leading the image forming medium to the nip portion; and

means for pushing downwardly the non-contact portions of the image forming medium below the guide plate to change the shape of the leading edge of the image forming medium from the flat shape to a convex shape while the image forming medium approaches the nip portion.

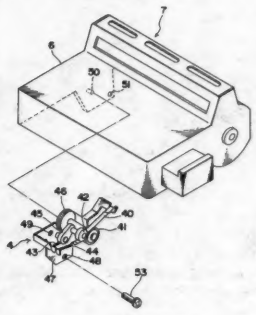
4,876,577

MULTI-COMPONENT PHOTORECEPTOR CARTRIDGE UNIT

Mitsuru Ogura, Nara, and Kimihide Tsukamoto, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 945,516, Dec. 23, 1986, abandoned.
This application Sep. 26, 1988, Ser. No. 251,055
Claims priority, application Japan, Dec. 27, 1985, 60-297306
Int. Cl.[4] G03G *21/00, 15/06*
U.S. Cl. 355—315 **3 Claims**

1. A photoreceptor cartridge unit for use in an image forming apparatus for accommodating a photoreceptor drum and its peripheral components in said image forming apparatus, which comprises a housing, a photoreceptor drum rotatably provided in said housing, a cleaner unit including a used toner containing and a multi-component separating unit, which includes a separating unit frame and a separating tape for separating copy paper from the photoreceptor drum following image transfer, mounted on said housing of said cartridge unit, sequentially disposed around said photoreceptor drum, said housing, photoreceptor drum, cleaner unit and separating unit being formed into one single unit to constitute said cartridge unit which is detachable with respect to said image forming



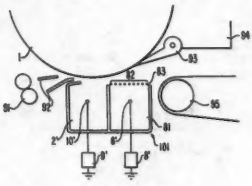
apparatus, said separating tape being stretched so as to freely expand and contract between said separating unit frame via a spring and said housing of said photoreceptor cartridge unit, such that proper tension on said separating tape is applied upon the fixing of said multi-component separating unit to said housing.

4,876,578

PAPER SEPARATION CHARGER FOR USE IN ELECTROPHOTOGRAPHIC COPIER AND THE LIKE

Kazuyoshi Hara, and Masataka Oda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 18, 1988, Ser. No. 195,676
Claims priority, application Japan, May 18, 1987, 62-120781
Int. Cl.[4] G03G *15/14*
U.S. Cl. 355—315 **9 Claims**



1. A paper separation charger for use in electro-photographic copiers for separating papers from a photosensitive member, comprising:

a corona wire for discharging electric charges toward said photosensitive member;

a housing enclosing said corona wire, said housing having an aperture portion at a side of said housing facing said photosensitive member; and

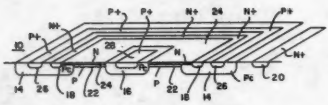
a grid member disposed at said aperture portion of said housing for regulating the amount of said electric charges travelling toward said photosensitive member, said grid member having a higher aperture efficiency at the upstream side of said grid member with respect to the paper transport direction of said photosensitive member than at the downstream side of said grid member.

4,876,579

LOW TOP GATE RESISTANCE JFET STRUCTURE

Christopher K. Davis, Merritt Island, and James D. Beasom, Melbourne Village, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Jan. 26, 1989, Ser. No. 301,835
Int. Cl.[4] H01L *29/80*
U.S. Cl. 357—22 13 Claims



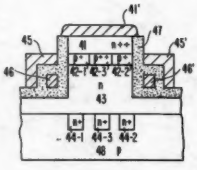
1. A junction field effect transistor comprising:
a bottom gate region of a first conductivity type;
a source and a drain region of a second conductivity type spaced in said bottom gate,
a channel region of said second conductivity type in said bottom gate region and extending between said source and drain regions;
a top gate region of said first conductivity type on said channel region for extending between said source and drain regions and into at least one of said source and drains region, wherein it terminates at a first edge; and
a top gate contact region of said first conductivity type, having a lower resistance than said top gate region, and contacting said top gate region at said first edge in said one of said source and drain regions.

4,876,580

TUNNEL INJECTION CONTROLLING TYPE SEMICONDUCTOR DEVICE CONTROLLED BY STATIC INDUCTION EFFECT

Jun-ichi Nishizawa, Sendai, Japan, assignor to Zaiden Hojin Handotai Kenkyu Shinkokai, Sendai, Japan

Division of Ser. No. 314,496, Oct. 23, 1981, abandoned. This application Apr. 27, 1987, Ser. No. 42,811
Claims priority, application Japan, Oct. 28, 1980, 55-151849
The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.
Int. Cl.[4] H01L *11/00*
U.S. Cl. 357—22 10 Claims



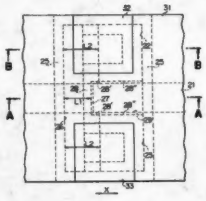
1. A tunnel injection controlling type semiconductor device, comprising:
a source semiconductor region having a first conductivity type for supplying carriers;
a drain semiconductor region for receiving said carriers;
a gate semiconductor region for controlling a flow of said carriers,
said source semiconductor region having a high impurity concentration region,
said source semiconductor region containing a highly-doped semiconductor region having a second conductivity type opposite to said first conductivity type,
said gate region being provided on said device at a close but separate site relative to said highly-doped semiconductor region having a second conductivity type to serve as a controlling electrode;
the source and drain regions defining a main current passageway having an n^{++}—p^{+}—n—n^{+} structure; and
an insulation layer substantially surrounding the n^{++}, p^{+} and n type regions.

4,876,581

FIELD EFFECT TRANSISTOR WITH SHORT CHANNEL LENGTH AND PROCESS OF FABRICATION THEREOF

Toshiyuki Ishijima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 207,837
Claims priority, application Japan, Jun. 17, 1987, 62-151837
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.3 9 Claims

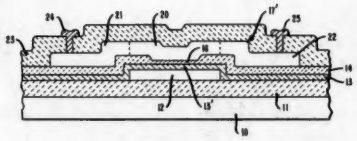


1. A field effect transistor fabricated on a semiconductor substrate of a first conductivity type, comprising:
(a) an insulating layer formed on said semiconductor substrate and upwardly extending from a major surface of the semiconductor substrate;
(b) a semiconductor layer of said first conductivity type formed in said insulating layer and having relatively long protrusions and a relatively short protrusion located between the relatively long protrusions, a bottom surface of said semiconductor layer being in contact with said semiconductor substrate, said relatively long protrusions and said relatively short protrusion laterally projecting from an upper portion of said semiconductor layer;
(c) a gate insulating film covering a leading end surface of said relatively short protrusion and respective inner side surfaces of said relatively long protrusions;
(d) a gate electrode formed in said insulating layer and contacting to said gate insulating film;
(e) source and drain regions of a second conductivity type formed in said insulating layer and contacting to respective leading ends of said relatively long protrusions for forming P-N junctions, respectively, bottom surface of said source and drain regions being in contact with an upper surface of said insulating layer;
(f) an upper insulating film covering said relatively long protrusions, said relatively short protrusion and said source and drain regions and formed with source and drain contact windows partially exposing upper surfaces of said source and drain regions, respectively, said p-n junctions being located under said upper insulating film; and
(g) source and drain electrodes formed on said upper insulating layer and respectively projecting through said source and drain contact windows so as to be in contact with the upper surfaces of said source and drain regions, respectively, wherein said source and drain regions are separated from each other by a part of said insulating layer and said gate electrode accommodated in the part of the insulating layer.

4,876,582
CRYSTALLIZED SILICON-ON-INSULATOR NONVOLATILE MEMORY DEVICE

John L. Janning, Dayton, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed May 2, 1983, Ser. No. 490,743
Int. Cl.[4] H01L 29/78, 29/34
U.S. Cl. 357—23.5 7 Claims

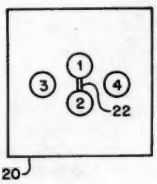


1. A semiconductor memory device comprising:
a substrate;
a conductive gate overlying a portion of said substrate;
a gate insulating film overlying said gate, said insulating film being relatively thin in a central portion of the region overlying said gate and relatively thick in the remaining portion of the region overlying the gate;
a conductive, silicon layer formed over said gate insulating film; and
wherein said gate insulating film is a dual layer of silicon nitride-silicon dioxide, said silicon nitride being of uniform thickness and said silicon dioxide being relatively thin in said central portion for permitting charged transfer therethrough and relatively thick in said remaining portion for preventing a charge transfer therethrough.

4,876,583
RADIATION-INDUCED SUBSTRATE PHOTO-CURRENT COMPENSATION APPARATUS

Arlen J. Hughes, Tustin, and Virgil H. Strahan, Orange, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 21, 1988, Ser. No. 171,494
Int. Cl.[4] H01L 29/78
U.S. Cl. 357—23.7 5 Claims

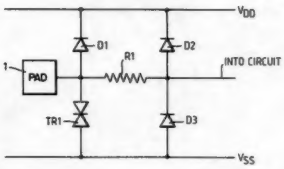


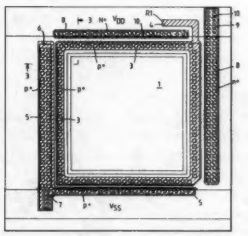
1. A radiation-induced substrate photo-current compensation apparatus for a silicon FET on a sapphire substrate comprising in combination:
first and second electrodes formed on the top surface of said silicon FET, said first and second electrodes aligned with each other to establish a conductive channel therebetween in said Silicon FET,
third and fourth electrodes formed on the top surface of said sapphire substrate, said third electrode being operatively aligned with said first electrode, said fourth electrode being operatively aligned with said second electrode, during a radiation event when a photo-current flows through said sapphire substrate from said first electrode to said second electrode, said third electrode provides current to said first electrode and said fourth electrode receives current from said second electrode thereby compensating for the radiation induced photo-current between said first and second electrodes.

4,876,584
ELECTROSTATIC DISCHARGE PROTECTION CIRCUIT

Clive R. Taylor, Stevenage, England, assignor to British Aerospace plc, London, England

Filed Sep. 8, 1987, Ser. No. 93,701
Claims priority, application United Kingdom, Sep. 10, 1986, 8621839
Int. Cl.[4] H01L 79/78
U.S. Cl. 357—23.13 4 Claims





1. An integrated circuit device including a substrate of one conductivity type, two power supply buses, a terminal pad on said substrate, said pad having at least two sides, said substrate comprising a first diffusion region of an other conductivity type underlying the pad, and an electrostatic discharge protection circuit associated with said terminal pad, the protection circuit comprising:
a diode directly connected between said pad and one of said power supply buses, said diode comprised of said first diffusion region and a second diffusion region of said one conductivity type, adjacent one side of the pad and connected to said power supply bus, said first and second diffusion regions forming said diode;
a punchthrough transistor directly connected between said pad and said other power supply bus, said punchthrough transistor comprised of a third diffusion region of said other conductivity type, spaced from said first region and adjacent an other side of said pad, said third region being connected to said other power supply bus so that the substrate, said first and third diffusion regions form said punchthrough transistor; and
a resistive path connecting said pad to the remainder of said integrated circuit, said resistive path comprised of said other conductivity type, whereby static charges applied to the pad are selectively transmitted to said one and said other power supply buses by means of said diode and said punchthrough transistor, respectively, so that the remainder of the integrated circuit is protected from said static charges, in which the protection circuit also includes a pair of diodes connected in series in a reverse bias configuration between the one and the other power supply buses

with the node between the diodes being connected to the end of the resistive path remote from the pad.

4,876,585

CONTACT TYPE IMAGE SENSOR WITH SEPARATE CHARGE TRANSFER DEVICE

Takashi Ozawa, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

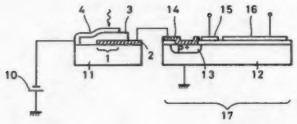
Continuation of Ser. No. 504,394, Jun. 15, 1983. This application Aug. 3, 1987, Ser. No. 81,531

Claims priority, application Japan, Jun. 18, 1982, 57-104800

The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.

Int. Cl.[4] H01L *29/78, 27/14, 31/00*; H01J *40/14*

U.S. Cl. 357—24 **8 Claims**



1. A contact type image sensor comprising:

a first substrate;

a plurality of first electrodes arranged in line and being disposed on said first substrate;

an amorphous silicon layer disposed on said first electrodes;

a second electrode disposed on said amorphous silicon layer, said second electrode working as common electrode, said second electrode and said amorphous silicon forming a Schottky contact therebetween;

first biasing means for applying a negative bias voltage to said second electrode;

a second substrate provided separately and spaced apart from said first substrate, said second substrate being made of P type semiconductor;

a charge transfer device formed on said second substrate, said charge transfer device including a plurality of input diodes each for storing electric charge whose amount respectively corresponding to output of associated one of said first electrodes and adapted to transfer said electric charge stored in said output diodes;

means for connecting each of said input diodes to said associated one of the first electrodes;

second biasing means for biasing said second substrate at a voltage equal to or lower than said negative vias voltage applied by said first biasing means.

4,876,586

GROOVED SCHOTTKY BARRIER PHOTODIODE FOR INFRARED SENSING

Rudolph H. Dyck, Palo Alto, and Jae S. Kim, Cupertino, both of Calif., assignors to Sangamo-Weston, Incorporated, Norcross, Ga.

Filed Dec. 21, 1987, Ser. No. 135,816

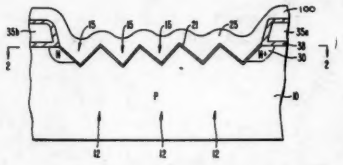
Int. Cl.[4] H01L *27/14*

U.S. Cl. 357—30 **15 Claims**

1. A plurality of electromagnetic radiation sensitive semiconductor structures on a substrate having a first surface region, each of said structures comprising:

a plurality of corrugations extending into the substrate from the first surface region, said corrugations having corrugation surfaces with a crystal orientation of <111>; and

an electrically conductive radiation sensitive coating disposed over the plurality of corrugations, said radiation sensitive layer exciting carriers upon exposure to radiation



such that at least a portion of said carriers are injected into said substrate.

4,876,587

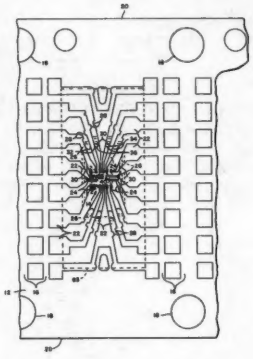
ONE-PIECE INTERCONNECTION PACKAGE AND PROCESS

Robert Hilton, Border Town, Australia; Ali Emamjomeh, Sunnyvale, and Jagdish Belani, Cupertino, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 5, 1987, Ser. No. 46,988

Int. Cl.[4] H01L *23/48, 23/28, 23/02*

U.S. Cl. 357—70 **8 Claims**



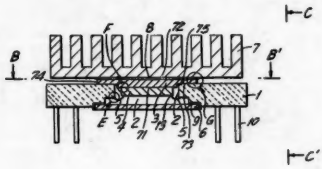
1. A one-piece interconnection structure for an integrated circuit, which comprises a plurality of conductive metal leads having body portions with outwardly directed first ends and second ends directed inward to surround a centrally disposed area, a plurality of contact fingers attached to the second ends of said body portions, said contact fingers having tips extending unsupported into the centrally disposed area, said contact finger tips being arranged and positioned for bonding to contact pads of an integrated circuit, said body portions of said leads having a first thickness and said contact finger tips having a second thickness less than the first thickness, said body portions of said leads having a cross-section with upper sides and lower sides forming an intersection between a top surface and a bottom surface of said body portions of said leads, said intersection between said upper and lower sides of said body portions of said leads being closer to one of said top surface and said bottom surface of said body portions of said leads, said contact finger tips having a surface parallel to said top surface and said bottom surface of said body portions of said leads, said surface of said contact finger tips being aligned with said intersection.

4,876,588

SEMICONDUCTOR DEVICE HAVING CERAMIC PACKAGE INCORPORATED WITH A HEAT-RADIATOR

Takashi Miyamoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,940
Claims priority, application Japan, Sep. 16, 1987, 62/233108
Int. Cl.[4] H01L 23/02
U.S. Cl. 357—81 9 Claims



1. A semiconductor device comprising;

a ceramic substrate having a through-hole, a plurality of terminals each including a first metallized layer of high melting point material formed on the surface of said ceramic substrate at a portion outside said through-hole and a first nickel-plated layer covering said first metallized layer of said terminal, a plurality of bonding pads each including a second metallized layer of said high melting point material formed on the surface of said ceramic substrate at a portion inside said through-hole, a second nickel-plated layer covering said second metallized layer of said bonding pad and a first gold-plated layer covering said second nickel-plated layer of said bonding pad, and a sealing film including a third metallized layer of said high melting point material formed on the surface of said ceramic substrate surrounding said through-hole and a third nickel-plated layer covering said third metallized layer of said sealing film;

a plurality of leads connected to respective said terminals, each lead including a lead body bonded to said first nickel-plated layer of said terminal by solder, a fourth nickel-plated layer covering said lead body and a second gold-plated layer covering said fourth-nickel plated layer of said lead,

a metal plate including a metal plate substrate having first and second flat surfaces, said first surface being covered by a fifth nickel-plated layer and a third goldplated layer on said fifth nickel-plated layer, said second surface being covered by a sixth nickel-plated layer so that any gold plating layer is free from on said sixth nickel-plated layer, said metal plate being bonded to said sealing film by solder in such a manner that said metal plate closes one side opening of said through-hole to form a recess defined by said metal plate and said throughhole and that said first flat surface of said metal plate substrate is located inside said recess and said second flat surface of said metal plate substrate is located outside said recess;

a semiconductor chip provided within said recess and fixed to said metal plate on said first flat surface;

a heat-radiator; and

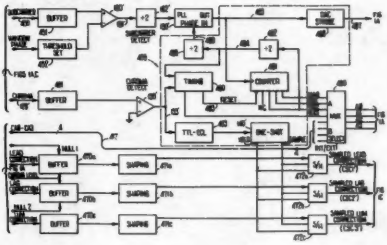
a silicone resin film provided between said radiator and said metal plate and adhered to said radiator and to said sixth nickel-plated layer on said second flat surface of said metal plate substrate to bond said radiator to said metal plate.

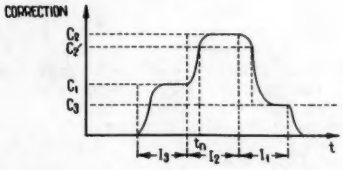
4,876,589

PHASE RESPONSIVE COMPOSITE VIDEO SIGNAL CONTROL SYSTEM

Michael L. Orsburn, Cooper City; Robert L. Hemsky; Terry L. Tucker, both of Boca Raton; Robert E. Schwarz, North Dade, and Craig F. Fearing, Hollywood, all of Fla., assignors to Utah Scientific Advanced Development Center, Inc., Burlington, Mass.

Division of Ser. No. 760,339, Jul. 29, 1985, which is a continuation-in-part of Ser. No. 604,845, Apr. 27, 1984, Pat. No. 4,642,682. This application Jan. 11, 1988, Ser. No. 142,691
Int. Cl.[4] H04N 9/74
U.S. Cl. 358—22 61 Claims





1. A phase responsive video signal correction system for correcting a video parameter of an image represented by a phase encoded video signal, comprising:

phase detecting means responsive to detect relative phase between a phase encoded component of an uncorrected video signal and a phase reference signal

correction signal means responsive to said plane reference signal for providing a plurality of correction signals, each of said correction signals being related to a predetermined range of phase differences between said phase reference signal and said uncorrected video signal;

means for dividing each cycle of said phase reference signal into a plurality of discrete color intervals, each of said color intervals being related to a particular one of said correction signals;

correction signal selecting means responsive to said detected relative phase for selecting a particular one of said correction signals, said correction signal selecting means being operative to select said particular one of said correction signals twice per cycle of said phase reference signal; and

means responsive to said selected particular one of said correction signals for correcting said uncorrected video signal to provide a color corrected video signal.

30. A phase responsive video signal correction system for correcting a video parameter of an image represented by an uncorrected input color video signal, comprising:

phase detecting means responsive to detect relative phase between a phase encoded component of said uncorrected input video signal and a reference signal in each one of a plurality of ranges of phases representable by said input video signal;

means for adjusting the phase of said reference signal so as to adjust the relative boundaries of said plurality of ranges of phases;

correction signal means responsive to said detected relative phase for generating a correction signal related to said detected relative phase; and

means responsive to said correction signal for correcting said uncorrected input video signal to provide a corrected video output signal.

4,876,590

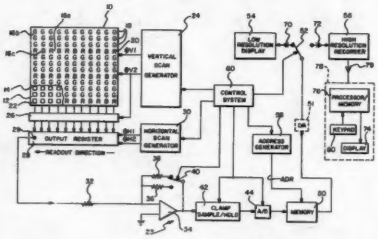
LOW RESOLUTION VERIFIER FOR A STILL VIDEO IMAGE

Kenneth A. Parulski, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 17, 1988, Ser. No. 208,303

Int. Cl.[4] H04N 9/04, 9/07

U.S. Cl. 358—41 **11 Claims**



1. Imaging apparatus for generating a lower resolution verification image signal from a higher resolution image source, said imaging apparatus comprising:

an area image sensor having a plurality of light-sensitive areas arranged two-dimensionally in parallel lines each oriented lengthwise in the horizontal high speed scanning direction;

a color filter array having a pattern of at least one line of same-color luminance filter elements oriented in the horizontal scanning direction adjacent to at least one line of chrominance filter elements including at least one other color oriented in the horizontal scanning direction;

means for scanning said image sensor and generating an output signal comprising a plurality of discrete image signals corresponding to the plurality of light-sensitive areas, said output signal comprising a line-separated pattern of luminance image signals and chrominance image signals; and

means for generating a low resolution verification image signal from all or a portion of the luminance signals from said lines of same-color luminance filter elements.

4,876,591

COLOR VIDEO SIGNAL GENERATING DEVICE USING MONOCHROME AND COLOR IMAGE SENSORS HAVING DIFFERENT RESOLUTIONS TO FORM A LUMINANCE SIGNAL

Akira Muramatsu, Tokyo, Japan, assignor to Fuji Photo Film Co., Kanagawa, Japan

Continuation of Ser. No. 134,748, Dec. 18, 1987, Pat. No. 4,823,186. This application Feb. 13, 1989, Ser. No. 309,655

Claims priority, application Japan, Dec. 19, 1986, 61-301688

Int. Cl.[4] H04N 9/09, 9/04

U.S. Cl. 358—43 **1 Claim**

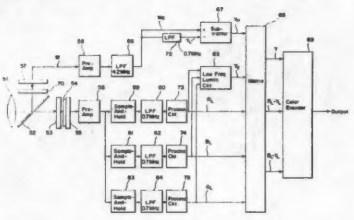
1. A device for generating a video signal, comprising:

means for splitting an optical image from an image pickup system into first and second images;

a monochrome image sensor which scans said first image in a horizontal direction and which has a first Nyquist spatial frequency band in said horizontal direction to produce a monochrome signal;

a color image sensor having a color filter array on a surface thereof which scans said second image in a horizontal direction and which has a second Nyquist spatial frequency band in said horizontal direction which is lower than said first Nyquist spatial frequency band to produce color-separated signals;

optical low-pass filter means for limiting said second image to a spatial frequency band lower than said first Nyquist spatial frequency band prior to scanning by said color image sensor;



low frequency luminance signal forming means for forming a low frequency luminance signal in response to said color-separated signals;

a matrix circuit for forming color difference signals in response to said low frequency luminance signal and said color-separated signals;

high frequency luminance signal forming means for forming a high frequency luminance signal in response to said monochrome signal; and

means for generating said video signal in response to said color difference signals and a luminance signal formed in response to at least said high frequency luminance signal.

4,876,592

SYSTEM FOR MECHANDISING AND THE EVALUATION OF RESPONSES TO BROADCAST TRANSMISSIONS

Henry Von Kohorn, 945 Treasure La., Vero Beach, Fla. 32963, assignor to Henry Von Kohorn, Vero Beach, Fla.

Continuation-in-part of Ser. No. 837,827, Mar. 10, 1986, Pat. No. 4,745,468. This application May 10, 1988, Ser. No. 192,248

Int. Cl.[4] H04H 9/00

U.S. Cl. 358—84 **68 Claims**

59. A method for evaluating responses to task-setting messages electronically transmitted from a central station to members of a remote shopping audience who have responded to said messages in a manner meeting predetermined response criteria, which method comprises the steps of:

transmitting audio-visual signals to the members of the audience, the audio-visual signals conveying a presentation of data accompanied by task-setting messages defining tasks to be performed by members of the audience;

transmitting response criteria to members of the audience at remote locations for responding to individual ones of said task-setting messages, said response criteria including a scoring basis for responses to be entered by the members of the audience within a specified period of time, said scoring basis including a difficulty level;

entering responses to said task-setting messages by members of said audience;

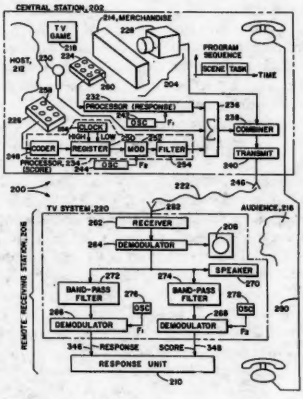
rejecting responses entered by members of the audience after expiration of said period of time;

comparing at least one response entered by a member of said audience within said period of time with said response criteria;

scoring each response relative to said response criteria in correlation with a difficulty level;

informing members of said audience of results of said scoring;

allowing interaction between a member of the remote audience and the central station by means of a communication link between a remote location and the central station;



computing the value of an award to be issued to a member of said audience who has entered an acceptable response to said task-setting message within said period of time, the value of the award being based on a score provided by said scoring step; and

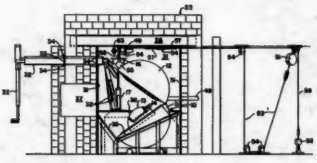
dispensing said award to said member of said audience who has entered the acceptable response.

4,876,593

TEMPORARY HOT CELL AND RELATED METHOD FOR HANDLING HIGH RADIATION LEVEL SOURCES

Frank I. Bauer, Perry; Robert S. Mavretish, New Stanton; Regis P. Shogan, Monroeville, and James Sejvar, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 19, 1988, Ser. No. 158,009
Int. Cl.[4] H04N 7/18
U.S. Cl. 358—100 **17 Claims**



1. A temporary hot cell for handling high level radiation sources comprising:

wall, ceiling and floor structures comprised at least in part of temporary structures forming an enclosure to reduce to acceptable levels radiation of the surround from high level radiation sources handled within the enclosure;

at least one manipulator arm extending through a wall structure of the enclosure to permit handling of high level radiation sources within the enclosure by an operator located external to the enclosure, said manipulator arm being removable from the enclosure through the wall structure;

a window positioned in a wall structure of the enclosure to allow an operator external of the enclosure operating the manipulator arm to view handling of high level radiation sources within the enclosure, said window also reducing to acceptable levels radiation of the surround by high level radiation sources within the enclosure;

a false floor in the enclosure, as necessary, to prevent high level radiation sources dropped within the enclosure from being out of reach of the manipulator arm; and

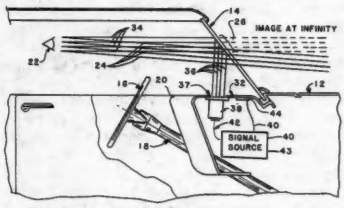
at least one access port in a wall structure of the enclosure to allow transport of tools and materials between the interior and exterior of the enclosure.

4,876,594

APPARATUS FOR PROMOTING THE VIGILANCE OF A MOTOR VEHICLE OPERATOR

Julius Schiffman, 12960 LaSalle La., Huntington Woods, Mich. 48070

Division of Ser. No. 187,834, Apr. 29, 1988, which is a division of Ser. No. 15,160, Feb. 17, 1987, Pat. No. 4,742,389, which is a continuation of Ser. No. 710,678, Mar. 12, 1985, abandoned.
This application Mar. 22, 1989, Ser. No. 326,917
Int. Cl.[4] H04N 7/18
U.S. Cl. 358—103 **6 Claims**



1. An apparatus for use in a ground vehicle having a windshield through which a driver may view conditions in the direction of travel of the ground vehicle, the apparatus comprising:

a first signal source for generating a first video signal comprising a series of moving visual images constituting a visual program of unpredictable, new information unrelated to the operation of the ground vehicle;

a second signal source for generating a second video signal comprising an image of information related to the operation of the ground vehicle;

a switch device connected to said first and second signal sources for selecting either said first signal source or said second signal source; and

a visual display means connected to said switch device for presenting a visual display of said video signal of said signal source selected by said switch device, the visual display utilizing a small fraction of the total windshield area and disposed in a position slightly above the line of sight of the driver toward the direction of travel of the ground vehicle,

whereby the driver can observe said visual display corresponding to said selected signal source while operating the ground vehicle and such observation will maintain the field of view of the driver in the proper position for operation of the ground vehicle and will maintain the driver in a mental state of vigilance.

4,876,595

DEVICE FOR REPRODUCING DIGITIZED VIDEO PICTURES USING AN IMPROVED RESTORATION METHOD

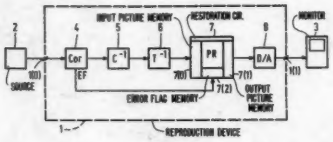
Raymond N. J. Veldhuis, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 20, 1988, Ser. No. 221,684

Claims priority, application Netherlands, Jun. 6, 1988, 8801441

Int. Cl.[4] H04N 7/12

U.S. Cl. 358—136 1 Claim



1. A device for reproducing digitally received video pictures comprising an array of picture elements, said device including a restoration circuit for restoring erroneous picture elements located within a reference sub-picture within which said erroneous picture elements are enclosed by non-erroneous picture elements, said restoration process comprising:

a preset process; and

an iteration prediction process;

characterized in that the preset process comprises:

a substitution step for replacing the erroneous picture elements by predetermined fixed picture elements;

a coefficient prediction step for determining a plurality of sets of prediction coefficients, each set being associated with the picture elements of a prediction field of a plurality of different prediction fields;

a selection step for selecting said prediction field for performing the coefficient prediction step in the iteration prediction process and the associated set of prediction coefficients for which the prediction coefficient function has the smallest value;

a picture element prediction step for determining the auxiliary picture elements on the basis of the prediction coefficients selected in the selection step; and

a substitution step for replacing the original erroneous picture elements of the reference sub-picture by the auxiliary picture elements to compose the up-dated reference sub-picture.

4,876,596

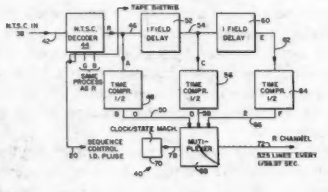
FILM-TO-VIDEO CONVERTER WITH SCAN LINE DOUBLING

Yves C. Faroudja, 26595 Anacapa Dr., Los Altos, Calif. 94022

Filed Oct. 25, 1988, Ser. No. 262,321

Int. Cl.[4] H04N 7/01, 3/36

U.S. Cl. 358—140 21 Claims



14. Apparatus for improving apparent picture quality in film-to-video transfer television systems operating in accordance with an odd ratio between film frame display rate and television scan field rate wherein the video scan line rate is multiplied by an integer for display at an output television display device and comprising:

film-to-video transfer means for transferring each film frame to a television signal of predetermined numbers of even and odd video fields at nominal line scan rate in accordance with a predetermined transfer scheme related to the odd ratio;

delay means comprising plural series connected field period delays, having an input connected to the film-to-video transfer means and providing at outputs thereof an undelayed portion and plural delayed signal portions, the total number of such portions being related to the odd ratio;

time compressor means comprising separate time compressors connected to the outputs of the delay means for time compressing and putting out each said portion of the television signal in accordance with an inverse of the integer to provide an undelayed and plural delayed signal time compressed components; and,

multiplexer means connected receive the time compressed components for selecting among the undelayed and the plural delayed components so as to derive line multiplied even and odd output video fields wherein even and odd scan lines are sequentially interleaved according to their spatial relation and wherein each resultant line multiplexed, sequentially interleaved even and odd composite video field obtained at the video output is the video representation of a single film frame.

4,876,597

VIDEO OBSERVATION SYSTEMS

Bernard J. J. Roy; Lorne D. O'Connor, both of Laval; Philippe F. Rioux, Boucherville, all of Canada; Donald A. Dingle, Burlingame, Calif., and Andre L. Raymond, Ste. Therese, Canada, assignors to ADT Security Systems, Inc., Parsippany, N.J.

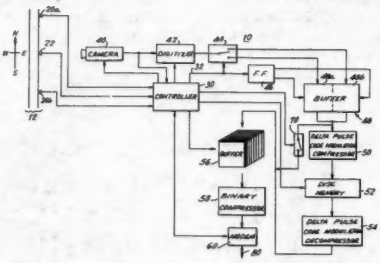
Continuation-in-part of Ser. No. 93,241, Sep. 4, 1987. This application Aug. 18, 1988, Ser. No. 233,711

Int. Cl.[4] H04N 7/04, 7/18

U.S. Cl. 358—141 42 Claims

MICROFICHE APPENDIX INCLUDED

(8 Microfiche, 744 Pages)



1. Apparatus for remote observation of objects comprising:

first means adjacent the objects for periodically generating data representative of an image of said objects, said data being broken into segments, each of which represents an element of said image;

second means adjacent said objects for transmitting to said point of observation the most significant portion of the data segment associated with each image element;

third means adjacent said point of observation for receiving said most significant portions and for displaying an image based on said most significant portions;

fourth means adjacent said point of observation for transmitting to the location of said objects a first signal indicative

of the acceptabilty of the image displayed by said third means;

fifth means adjacent said objects for receiving said first signal and for transmitting to said point of observation the next most significant portion of the data segment associated with each image element only if said first signal indicates that the image displayed by said third means is not acceptable; and

sixth means adjacent said point of observation for receiving said next most significant portions and for displaying an image based on said most and next most significant portions of said next most significant portions are transmitted;

wherein said objects move relative to said first means so that a portion of an object feature to be observed may be in one image and another portion of said object feature may be in the next sequential image, and wherein said apparatus further comprises:

first and second buffer means adjacent said point of observation, each of said buffer means being large enough to hold all of th data for one image;

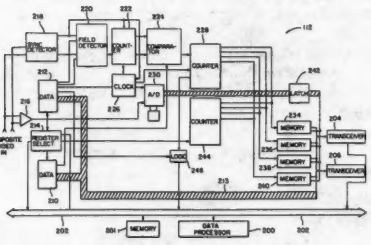
means for storing the data received from said second and fifth means for successive images in alternate ones of said first and second buffers so that the data for two sequential images is respectively stored in said first and second buffers; and

means for displaying an image based on part of the data stored in said first buffer and part of the data stored in said second buffer so that both portions of said object feature are visible in the displayed image.

4,876,598
APPARATUS FOR DIGITIZING A COMPOSITE VIDEO SIGNAL

Kenneth T. Carlstedt, Seattle, and Richard S. Penn, Issaquah, both of Wash., assignors to Tecon, Inc., Redmond, Wash.

Filed May 20, 1988, Ser. No. 196,386
Int. Cl.[4] H04N *5/14*
U.S. Cl. 358—160 **17 Claims**



3. Apparatus coupleable to a standard personal computer for digitizing a composite video signal of the type which includes an analog image signal that carries information for reproducing an image on a cathode ray tube and a composite synchronization signal which carries a horizontal synchronization signal and a vertical synchronization signal for synchronizing the video signal receiver and for controlling the decoding of the image signals to produce the image, said apparatus comprising:

interface means for interfacing said apparatus with the standard personal computer, said interface means including means for receiving control data from the standard personal computer and for transmitting digital data values to the personal computer;

control means for controlling the digitization of the composite video signal, said control means including means for extracting the composite synchronization signal from the composite video signal, said control means being responsive to the control data for initiating the digitization of the composite video signal;

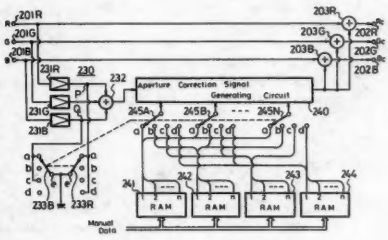
sample clock means for periodically providing a plurality of clock pulses wherein each clock pulse has a substantially constant, predetermined duration, said sample clock means being responsive to the composite synchronization signal to start generating the clock pulses; and

data converter means responsive to the clock pulse provided by said sample clock means for converting the analog image signals to digital data values, said converter means being coupled to said interface means for transferring the digital data values thereto.

4,876,599
APERTURE CORRECTION CIRCUIT

Taku Kihara, Kanagawa, Japan, assignor to Sony Corp., Tokyo, Japan

Division of Ser. No. 171,764, Mar. 22, 1988. This application Mar. 14, 1988, Ser. No. 323,401
Claims priority, application Japan, Mar. 31, 1987, 62-080310
Int. Cl.[4] H04N *5/14*
U.S. Cl. 358—162 **3 Claims**



1. An aperture correction circuit comprising:

a video signal source generating first, second and third primary color signals;

matrix circuit means receiving said first, second and third primary color signals and being responsive to a control signal for selectively matrixing said first, second and third primary color signals to produce a respective composite digital color video signal;

aperture correction signal generating means supplied with said composite digital color video signal for generating an aperture correction signal therefrom;

adding means for adding said aperture correction signal to each of said first, second and third primary color signals; and

characteristic control means responsive to said control signal for controlling characteristics of said aperture correction signal generated by said aperture correction signal generating means in coordination with the selective matrixing of said first, second and third primary color signals.

4,876,600
METHOD AND DEVICE FOR REPRESENTING A COMPOSITE IMAGE ON A SCREEN OF A SCREEN DEVICE

Ludwig Pietzsch, Karlsruhe; Detlef Senger, Ettlingen; Horst Winter, Karlsruhe, and Hubert Völlinger, Steinmauern, all of Fed. Rep. of Germany, assignors to IBP Pietzsch Gmbh, Ettlingen, Fed. Rep. of Germany

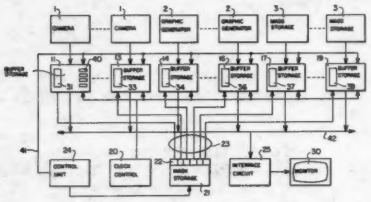
Filed Jan. 26, 1988, Ser. No. 148,755
Claims priority, application Fed. Rep. of Germany, Jan. 26, 1987, 3702220
Int. Cl.[4] H04N *5/262, 9/74*
U.S. Cl. 358—183 **16 Claims**

1. A device for representing a composite image on a screen of a screen device, said image being composed of a plurality of

natural and/or synthetic sub-images which are generated by different sources, comprising:

a storage associated to each of said sources, each said storage having a control element;

a mask storage for storing data words which receives directions for composing said sub-images from a control unit and having an output register, wherein the width of data



in said data words, which may be read parallelly of, conforms to the number of said sources and one bit is set per each said data word; and

a control circuit into which the content of the mask storage is written at pixel frequency,

the output register of said mask storage being connected to the control element of each said storage.

4,876,601

IMAGING APPARATUS HAVING ZOOM CAPABILITY VIA READOUT VARIATION

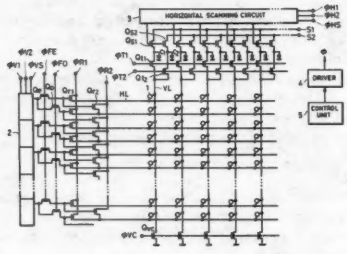
Seiji Hashimoto, Yokohama, and Tadanori Harada, Tokorozawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 15, 1988, Ser. No. 168,176

Claims priority, application Japan, Mar. 31, 1987, 62-77953

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.26 **26 Claims**



21. An imaging apparatus comprising:

(a) a plurality of pixels arranged in lines and columns; and

(b) control means for selectively switching a reading operation mode between a first mode in which signals on said pixels are sequentially read in a first sequence at a first speed and a second mode in which signals on a selected portion of an area of said pixels are sequentially read in a second sequence different from said first sequence and at a second speed different from said first speed, said second sequence being a sequence in which signals are simultaneously read from pixels of a group of horizontal lines of pixels and then signals are simultaneously read from pixels of a group of horizontal lines of pixels and then signals are simultaneously read from pixels of a next group of horizontal lines of pixels, said next group of horizontal lines of pixels including at least one horizontal line belonging to the preceding group of horizontal lines, thus conducting simultaneous reading of signals from each, of successive groups of horizontal lines of pixels.

4,876,602

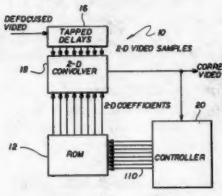
ELECTRONIC FOCUS CORRECTION BY SIGNAL CONVOLUTION

Robert Zwirn, Los Angeles, and Gerard L. Rafanelli, Fountain Valley, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 2, 1988, Ser. No. 189,073

Int. Cl.[4] H04N *5/208*

U.S. Cl. 358—227 **21 Claims**



1. An electronic focus correction system for correcting focus aberrations in an electro-optical system having means for providing electrical signals representative of a scene of image data, said electronic focus correction system comprising:

first means for providing plural sets of weighting coefficients;

second means for multiplying the electrical signals corresponding to a window around each pixel of image data by a set of said weighting coefficients and for assigning to each pixel a weighted signal equal to the sum of the products of the coefficients times the electrical signals within the window to provide one of a plurality of weighted sequential output signals which constitute a corrected image;

third means responsive to the output of said second means for measuring a figure of merit of said output image; and

fourth means operatively connected to said third means for selectively providing control signals, in response to said measured figure of merit, to change said plurality of weighted coefficients to thereby optimize said figure of merit.

4,876,603

SIGNAL PROCESSING DEVICE FOR AUTOMATIC-FOCUSING VIDEO SIGNAL IN ELECTRONICALLY CONTROLLED PHOTOGRAPHIC CAMERA

Noboru Suzuki; Shigeo Toji, and Yukio Uenaka, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,449

Claims priority, application Japan, Mar. 26, 1987, 62-72916; Mar. 26, 1987, 62-45016[U]

Int. Cl.[4] H04N *5/232*

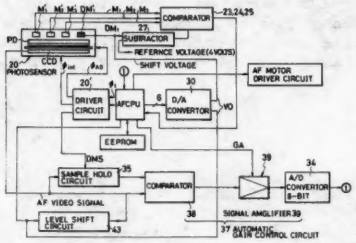
U.S. Cl. 358—227 **10 Claims**

1. A signal processor for an automatic focusing video signal in an electronically controlled camera, comprising:

a photosensor having an electric charge accumulating part for accumulating a signal electric charge which corresponds to an object brightness, an exposure monitor for accumulating an electric charge which corresponds to the amount of said signal electric charge accumulated in said electric charge accumulating part, and a dark charge monitor for accumulating a dark charge therein, said photosensor being adapted to sequentially transmit said

signal electric charge accumulated in said electric charge accumulating part; and

an automatic gain control circuit for automatically controlling the gain of said automatic-focusing video signal produced from said photosensor when said object contrast is low, in such a manner that a low-contrast corresponding level difference, which is the difference between a high-luminance corresponding level and a low-luminance corresponding level of an automatic-focusing video signal arising from a low-contrast object, approaches a high-contrast corresponding level difference, which is the difference between a high-luminance corresponding level and a low-luminance corresponding level of an automatic-focusing video signal arising from a high-contrast object.

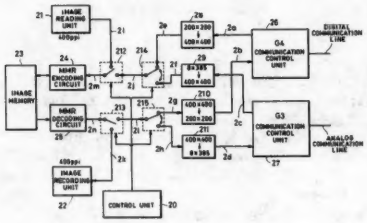


4,876,604

APPARATUS FOR COMMUNICATING IMAGE DATA OF DIFFERENT RESOLUTIONS

Hiroshi Nobuta, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 177,350
Claims priority, application Japan, Apr. 15, 1987, 62-90877
Int. Cl.[4] H04N *1/00, 1/40*
U.S. Cl. 358—400 20 Claims



1. An image communication apparatus for processing image data of different resolutions, said apparatus comprising:

a memory for storing image data;

image data supply means for supplying first and second image data of different resolutions, respectively; and

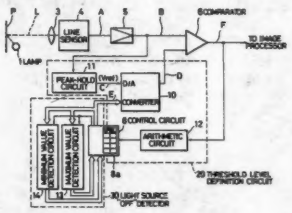
an image data resolution converter for converting the resolution of at least one of said first and second image data such that the resolution of the first and second image data supplied to said memory is unified.

4,876,605

IMAGE READING DEVICE

Osamu Ishikawa, and Kiyoshi Sumiya, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Dec. 31, 1987, Ser. No. 140,509
Claims priority, application Japan, Jan. 12, 1987, 62-003337; Dec. 16, 1987, 62-319327
Int. Cl.[4] H04N *1/40, 1/00*
U.S. Cl. 358—400 3 Claims



1. An image reading device comprising

a light source for illuminating a medium to be read,

a line sensor including a line of photoelectric conversion elements for receiving light from the medium and producing an image signal,

means for determining white levels for respective intervals into which said line of photoelectric conversion elements are divided,

means for setting threshold levels for the respective intervals on the basis of said white levels for the respective intervals,

means for comparing the image signal with said threshold levels to produce a series of binary signals, and

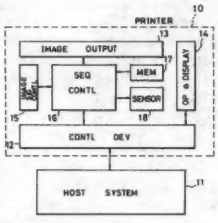
means for detecting the off condition of said light source on the basis of the relative magnitudes between said white levels for said respective intervals.

4,876,606

IMAGE FORMING SYSTEM

Masahiko Banno, Yokohama, and Yasushi Nakazato, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 27, 1988, Ser. No. 186,604
Claims priority, application Japan, Apr. 28, 1987, 62-103283
Int. Cl.[4] H04N *1/32*
U.S. Cl. 358—434 20 Claims



1. An image forming system comprising:

an image forming apparatus at least comprising an image forming part for forming an image, a sensor part for detecting status information on said image forming apparatus, a memory for storing the status information, an operation and display part for entering an instruction to said image forming apparatus and for displaying a message and

a control part for controlling an operation of said image forming apparatus; and

a host system coupled to said image forming apparatus through said control part,

said control part having means for controlling said memory to read out said status information at an arbitrary time, and means for converting said status information into a message.

4,876,607

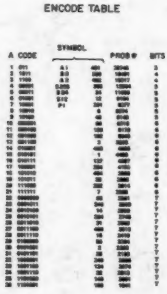
COMPLEX CHARACTER GENERATOR UTILIZING BYTE SCANNING

Samuel C. Tseng, Pleasantville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 31, 1982, Ser. No. 364,061

Int. Cl.[4] H04N *1/415*

U.S. Cl. 358—261.2 **17 Claims**



1. A method of compacting a complex character, wherein said character is defined by an I row by J column matrix, wherein each row is comprised of J bytes, where I and J are integers, said method comprising the steps of:

scanning each row a byte at a time to concurrently determine if a given byte of any numerical value has the same numerical value as the previous byte in the scanning sequence or has the same numerical value as the above byte in the same column and immediately preceding row;

encoding the number of successive bytes that are the same numerical value as the previous byte as a symbol Pn, where n is an integer which is indicative of the number of given bytes scanned in sequence which are equal in numerical value to the previous byte;

encoding the number of successive bytes that are the same numerical value as the above bytes as a symbol Am, where m is an integer which is indicative of the number of given bytes scanned in sequence which are equal in numerical value to the above bytes; and

encoding any given byte, which is not of the same numerical value as the previous byte or the above byte, with a symbol Sx, where x is indicative of the numerical value of said any given byte.

4,876,608

FOCUS AND SIGNAL TO NOISE MEASUREMENT ROUTINES IN INPUT SCANNERS

Richard B. Eaton, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 7, 1988, Ser. No. 268,091

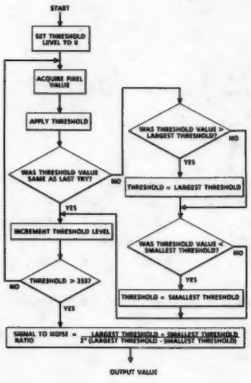
Int. Cl.[4] H04N *1/32, 1/40*

U.S. Cl. 358—443 **10 Claims**

1. In an input scanner for deriving an electronic representation of an image from an original, having a light intensity detecting arrangement, deriving image information across a scan line in a fast scan direction, and producing a signal proportional to the intensity of light detected over a selected period from the original for a discrete area thereof; means for providing relative movement between the original and the light intensity detecting arrangement in a slow scan direction, and a thresholding arrangement applying a selected threshold value to each signal to produce a first binary output when the threshold exceeds the signal, and a second binary output the threshold does not exceed the signal, a method of examining imaging quality comprising the steps of:

a. placing a selected test pattern original at an imaging position relative to the light intensity detecting arrangement;

b. causing the relative movement providing means to maintain said test pattern original and the light intensity detecting arrangement at fixed relative positions, whereby for



each scan line produced, the same image information is derived from the test pattern original;

c. producing signals for a plurality of scan lines;

d. for each scan line for which signals are produced, applying a different threshold value to the signals constituting the scan line at the thresholding arrangement;

e. detecting tranmissions in the output of the thresholding arrangement, as signals representing image information originally producing a first binary output with a first threshold value applied subsequently produce a second binary output as the threshold value is varied; and

f. deriving image quality information from said detected transitions.

4,876,609

DIGITAL COPIER WITH A FACSIMILE FUNCTION

Masaaki Ogura, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed May 9, 1988, Ser. No. 191,880

Claims priority, application Japan, May 9, 1987, 62-113074

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—443 **7 Claims**

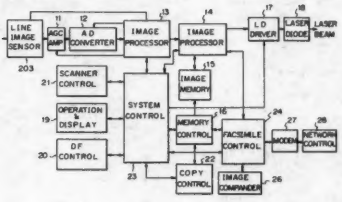
1. An image forming apparatus having a function of storing and reading out image data which are associated with a plurality of pages of documents, comprising:

first store means for sequentially storing image data inputted;

second store means for storing leading addresses which are assigned to the individual pages of the image data which are stored in said first store means;

first reading means for reading the leading addresses out of said second store means and reading the image data out of said first store means one page at a time on the basis of the leading addresses; and

commanding means for commanding an order in which the individual pages are stored in said first store means or in an



opposite order said first reading means should read the leading addresses out of said second store means.

4,876,610

IMAGE PROCESSING APPARATUS WITH BINARIZATION-ERROR DISPERSAL

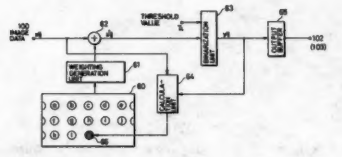
Hidefumi Ohsawa, Kawaguchi; Akihiro Katayama, Kawasaki; Hiroshi Hosokawa, Yokohama; Izuru Sunohara, Ichikawa, and Masahiko Yoshimoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1987, Ser. No. 137,439

Claims priority, application Japan, Dec. 25, 1986, 61-313168; May 21, 1987, 62-122611

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—443 **37 Claims**



34. An image processing apparatus comprising:

input means for inputting digital image data;

binarization means for binarizing the digital image data input by said input means by using a predetermined threshold value;

calculation means for calculating a difference between the digital image data input by said input means and output data after the digital image data has been binarized, to provide error data;

process means for processing such that the error data provided by said calculation means is dispersed to the peripheral digital image data; and

discrimination means for discriminating a feature of an area in which the digital image data input by said input means exists,

wherein said process means is adapted to vary the area in which the error data is dispersed, in accordance with the feature discriminated by said discrimination means.

4,876,611

PROCESS FOR RECORDING SEMIHALFTONE IMAGES

Gerhard Fischer, Offenbach, and Helmut Quabeck, Babenhausen, both of Fed. Rep. of Germany, assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Sep. 21, 1987, Ser. No. 98,941

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1986, 3634939

Int. Cl.[4] H04N *1/23, 1/46*

U.S. Cl. 358—456 **22 Claims**

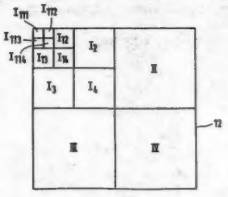
16. A process for reproducing an image by scanning the image with a scanning dot having a predetermined area to obtain information related to the single tonal values of the image, and using the information to reproduce the image on a display medium by generating a multiplicity of recording dots of fixed predetermined tonal value and dimension, and of variable frequency per unit area, the improvement comprising:

(1) detecting discrete tonal values for discrete areas of the image corresponding to the scanning dot area,

(2) storing information corresponding to the discrete tonal values for the full image area to be reproduced,

(3) defining at least one scanning field equivalent to a portion of an image area, containing k scan dots,

(4) calculating the average tonal value of each scanning field by averaging the tonal values of each of the scanning dots within the field,



(5) subdividing each of the scanning fields into at least two subfields,

(6) calculating the average tonal value of the subfields such that the sum of the tonal values of the subfields equals the tonal value of the field which preceded the subfields,

(7) repeating steps (5) and (6) until the number of scan dots contained in the subfield equals one or the ratio of the scan dot area to the recording dot area whichever is greater, and

(8) generating on the display medium recording dots of fixed tonal value and dimension at a frequency and location to produce tonal values in each of the subfields in accordance with the calculated tonal values for each of the subfields.

4,876,612

IMAGE PROCESSING APPARATUS

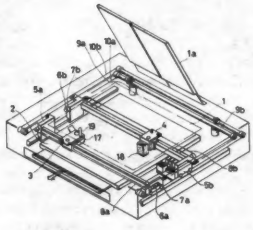
Toshio Honma, Tokyo, and Nobuyuki Watanabe, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 798,672, Nov. 15, 1985, abandoned. This application Dec. 29, 1988, Ser. No. 291,361

Claims priority, application Japan, Nov. 19, 1984, 59-243931

Int. Cl.[4] H04N *1/04*

U.S. Cl. 358—474 **24 Claims**



1. An image processing apparatus comprising:

(a) means for reading out an object, said reading means having at least three reading element groups, each group including a concerned pixel reading element and a periph-

eral pixel reading element, said concerned pixel reading element and peripheral pixel reading element being linearly arranged in a predetermined direction;

(b) first scan means for scanning the object in a second direction inclined by a predetermined angle from said predetermined direction in said reading means; and

(c) second scan means for scanning the object along a direction transverse to said second direction so that at least part of a read-out range of said peripheral pixel reading element is overlapped.

4,876,613

MANUALLY OPERATED COPIER WITH A DAMPER

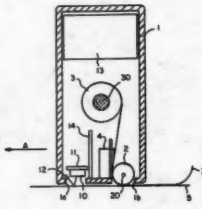
Iwakazu Honda, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 30, 1987, Ser. No. 115,441

Claims priority, application Japan, Nov. 5, 1986, 61-169789[U]

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—471 **6 Claims**



1. In a manually operated copier having an image reading means which is manually operated for scanning a document to read an image on said document, a printing means for printing said read image on a given sheet of paper and a transportation roller for transporting said sheet out of said copier, the improvement wherein said transportation roller is so disposed that the surface thereof touches said document, wherein said transportation roller is longer than the width of said sheet of paper and wherein said copier further comprises a damper for causing said roller to rotate at a uniform speed.

4,876,614

TRACK-READJUSTED MAGNETIC-TAPE RECORDER WITH TRANSVERSE TRACKING

Jürgen Kaaden, Pfaffenweiler, and Hartmut Schandl, Villingen-Schwenningen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

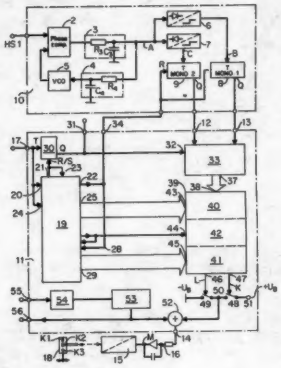
Continuation of Ser. No. 871,413, May 15, 1986, abandoned. This application Oct. 14, 1988, Ser. No. 259,434

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1984, 3435649

Int. Cl.[4] H04N *5/783*

U.S. Cl. 360—10.2 **18 Claims**

4. A track readjustment arrangement for a video magnetic tape recorder with magnetic tape having motion in a predetermined direction; at least two magnetic heads traveling across said motion direction for scanning transversely signals recorded on said magnetic tape; a rotatable head wheel carrying said magnetic heads and having a central axis; said magnetic heads having air gaps with an azimuth angle alternating mirror-inverted around said central axis; said signals scanned by said magnetic heads may have phase errors of horizontal sync pulses, said phase errors having magnitude and direction; each of said magnetic heads providing control parameters derived from the magnitude and direction of said phase errors; and means for selectively axially varying and resetting said head wheel as a function of said control parameters, said headwheel with all magnetic heads following recorded magnetic tracks on said tape during still picture reproduction as well as during normal reproduction when said tapes moves, said headwheel



with said magnetic heads following said recorded magnetic tracks exclusively through said phase errors.

4,876,615

DATA DECODING SYSTEM

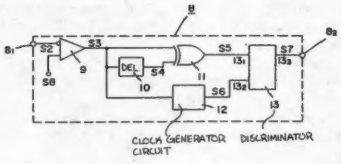
Tadaaki Chikashige, Tokyo, Japan, assignor to Nakamichi Corporation, Tokyo, Japan

Filed Oct. 30, 1987, Ser. No. 114,777

Claims priority, application Japan, Oct. 31, 1986, 61-260493

Int. Cl.[4] G11B *5/09*

U.S. Cl. 360—43 **6 Claims**



1. A data decoding system for decoding digital signals stored on a magnetic medium so that one of logical variables "1" and "0" is indicated by a state inversion of signals "H" and "L" at a time interval of a bit cell period, while the other logical variable is indicated by a state inversion at a time interval of half of said bit cell period, said data decoding system characterized by:

means to produce a processing signal having the logic state thereof varying in response to the inversion of the logic state corresponding to only one of said logical variables, and

means to form an NRZ signal by exclusive logical addition of said processing signal and a delay signal delaying said processing signal for a time interval of one bit cell period.

4,876,616

APPARATUS FOR REPRODUCING A DIGITAL SIGNAL

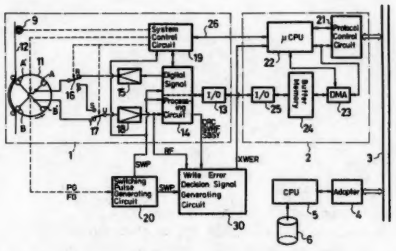
Azusa Katsumata, and Shigeyuki Satomura, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 220,028

Claims priority, application Japan, Jul. 22, 1987, 62-183022; Jul. 22, 1987, 62-183023

Int. Cl.[4] G11B 5/09

U.S. Cl. 360—53 14 Claims



1. An apparatus for reproducing a digital signal from a recording medium which has tracks patterned thereon in each of which are recorded a plurality of blocks of data signals, each block of data including a header, a parity of the header and other digital information, the apparatus comprising:

means for reproducing the recorded signals from the recording medium;

error detecting means, which monitors the reproduced header parity, for detecting good parity for each block and outputting a corresponding good parity detection signal;

counting means for counting the good parity detection signal from the error detecting means; and

comparing means for comparing the error count in the counting means with a predetermined value and outputting a write error decision signal, indicating the corresponding data block has no uncorrectable errors, when the count exceeds the predetermined value, and indicating that the corresponding data block has uncorrectable errors, when the count does not exceed the predetermined value.

4,876,617

SIGNAL IDENTIFICATION

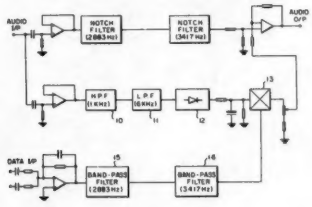
Stuart J. Best, and Reginald A. Willard, both of Hayes, England, assignors to Thorn Emi plc, London, England

Filed May 5, 1987, Ser. No. 46,126

Claims priority, application United Kingdom, May 6, 1986, 8611014

Int. Cl.[4] G11B 15/04, 5/62

U.S. Cl. 360—60 4 Claims



1. Apparatus for the labelling of signals, said apparatus having an encoder circuit comprising:

means to eliminate at least two particular, predetermined frequency bands from a given signal to form corresponding notches therein;

means to insert a code sequence into said notches, the code comprising frequencies corresponding to the respective centre frequencies of the notches;

means to inhibit the insertion of said notches and hence said code sequence when the signal frequency lies outside a specified range;

means to monitor the amplitude of the said signal and means to set the code amplitude at a predetermined level below the signal amplitude level, so that the code level varies with the signal level.

4,876,618

METHOD FOR DETECTING ZERO TRACK

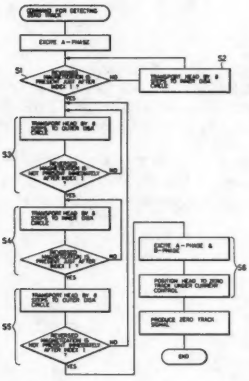
Jun Ide, and Tomoo Iizumi, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Sep. 8, 1987, Ser. No. 94,295

Claims priority, application Japan, Nov. 22, 1986, 61-277820

Int. Cl.[4] G11B 5/55, 21/08

U.S. Cl. 360—78.13 3 Claims



1. A method for detecting a zero track of a plurality of concentrically formed tracks on a disk-shaped recordable medium by transporting a detection head along the medium by means of a stepping motor having at least two excitable phases, the recordable medium being rotated in a predetermined direction and having at least one index mark on each track, the method comprising the steps of:

(a) forming a recorded region at least on a part of the concentrically formed tracks, onto which data has been previously recorded;

(b) forming a non-recorded region on tracks outside the recorded region;

(c) exciting a first phase of the stepping motor so as to transport the detecting head to a track;

(d) detecting by means of the detecting head if data has been recorded immediately after an index mark on the track, and if data has been recorded proceeding a step(e) otherwise if data has not been recorded transporting the head inwards towards the center of the medium and repeating this step;

(e) transporting the head outwards from the center of the medium by a certain number of steps of the stepping motor to a track;

(f) detecting by means of the head if data has been recorded immediately after an index mark on the track of step (e), and if data has not been so recorded proceeding a step(g) otherwise if data has been so otherwise recorded, returning to step (e);

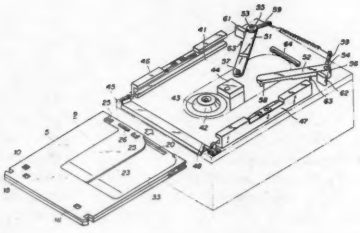
(g) transporting and the head inwards by a certain number of steps of the stepping motor to a track;
(h) detecting by means of the detecting head if data has been recorded immediately after an index mark on the track of step (g), and if data has been so recorded proceeding to a step(i) otherwise if data has not been so recorded, returning to step (g);
(i) transporting the head outwards by a certain number of steps of the stepping motor to a track;
(j) detecting by means of the detecting head if data has been recorded immediately after an index mark on the track of step (i), and if data has not been so recorded proceeding to a step (k) otherwise if data has been so recorded, returning to step (e);
(k) exciting both phases of the stepping motor simultaneously so as to position the head over the track of step (i); whereby the track of step (i) is the zero track.

4,876,619

DISK CARTRIDGE HAVING SHUTTER AND A DEVICE FOR OPENING AND CLOSING THE SHUTTER

Masayuki Suzuki, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 86,729, Jul. 22, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,242
Claims priority, application Japan, Nov. 22, 1985, 60-180502[U]
Int. Cl.[4] G11B *5/012, 23/03*
U.S. Cl. 360—97.01 **8 Claims**



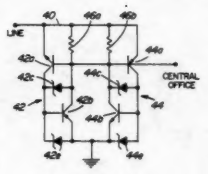
1. In a disk cartridge having an upper side connected by a lateral edge to a lower side, said cartridge having a shutter that may be slide along the lateral edge by a shutter opening and closing device between a first position for closing signal readout or signal write apertures on the upper or lower side of the disk-containing cartridge and a second position for opening said apertures, the improvement comprising said opening and closing device having a first rotary arm and a second rotary arm, said shutter having a lateral side with an engaging hole for engagement with the first rotary arm of the shutter opening and closing device, said hole extending orthogonal to a direction of insertion for said disk cartridge, said first rotary arm being engaged in said opening and being turned by the movement of insertion of said disk cartridge to slide said shutter along the lateral edge of the cartridge from said first position to said second position to open said apertures, and a recess in the lateral edge of said cartridge at a position exposed by said shutter when moved to the second position, said recess receiving a portion of said second rotary arm as the cartridge moves to the inserted position and the shutter is in the second position.

4,876,620

PROTECTION DEVICES AND ARRANGEMENTS FOR TELEPHONE LINES

Jerzy Borkowicz, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Sep. 29, 1988, Ser. No. 250,651
Int. Cl.[4] H02H *3/24*
U.S. Cl. 361—56 **17 Claims**



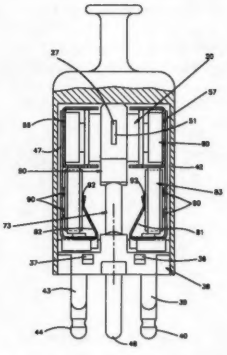
1. A protection device comprising:
first and second terminals, for connection to a wire of a telephone subscriber line and to ground respectively, and a third terminal;
a first SCR (semiconductor controlled rectifier) having a cathode and an anode connected to the first and second terminals respectively, and a gate adjacent to the cathode coupled directly to the third terminal;
a second SCR, complementary to the first SCR, having an anode and a cathode connected to the first and second terminals respectively, and a gate adjacent to the anode coupled directly to the third terminal; and
resistive means connected between the first and third terminals, whereby a predetermined current flowing via the resistive means triggers one of the SCRs to conduct current between the first and second terminals.

4,876,621

LINE PROTECTOR FOR A COMMUNICATIONS CIRCUIT

Wayne Rust, Berwyn, and Alexander G. Gilberts, Algonquin, both of Ill., assignors to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Dec. 8, 1988, Ser. No. 281,492
Int. Cl.[4] H02H *9/04*
U.S. Cl. 361—58 **10 Claims**



1. A line protector for acommunications circuit comprising:
(a) an insulating means;
(b) a surge voltage arrestor in spaced relationship to said insulating means, said arrestor having opposed electrodes;

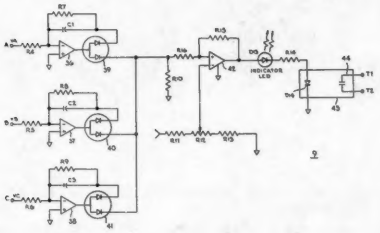
(c) first and second conductive elements on said insulating means and extending therefrom so as to be in electrical contact, respectively, with said opposed electrodes;
(d) third and fourth conductive elements on said insulating means and extending therefrom towards said arrestor; and
(e) two devices each having the capability of limiting current flowing therein to have an amplitude which is no greater than a predetermined amplitude, one of said devices in contact with said first and third conductive elements to provide a conductive path therebetween and the other of said devices in contact with said second and fourth conductive elements to provide a conductive path therebetween.

4,876,622

CIRCUIT BREAKER WARNING RELAY AND CONTROL ACCESSORY

John J. Dougherty, Avon, Conn., assignor to General Electric Company, New York, N.Y.

Filed Aug. 3, 1988, Ser. No. 228,135
Int. Cl.[4] H02H *3/08*
U.S. Cl. 361—94 **15 Claims**



1. A circuit breaker warning relay and indicator circuit comprising:
a plurality of input terminals;
a corresponding plurality of first operational amplifiers connected with said input terminals;
a corresponding plurality of double-diodes connected with outputs from said first operational amplifiers;
said double-diodes having first outputs connected in parallel with each other and in series with one input to a second operational amplifier having ON and OFF states, another input to said second operational amplifier being connected with a reference voltage; and
an indicator diode connected to an output from said second operational amplifier for providing indication of the ON state of said second operational amplifier.

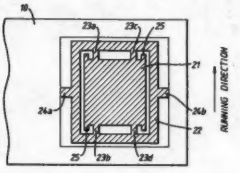
4,876,623

MAGNETIC DISC DEVICE WITH GIMBAL SPRING HAVING VARIABLE ELASTIC CHARACTERISTICS

Shigeru Takekado, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Sep. 30, 1987, Ser. No. 103,017
Claims priority, application Japan, Sep. 30, 1986, 61-231762
Int. Cl.[4] G11B *5/48*
U.S. Cl. 360—104 **6 Claims**

1. A magnetic recording device for recording and reproducing data on a magnetic disc, comprising:
a magnetic head for contacting the magnetic disc and for reading and writing data on the magnetic disc;
means for rotatably supporting the magnetic disc for contact with said magnetic head; and
gimbal plate means flexibly supporting the head for movement in two directions of rotation with respect to the magnetic disc and for compensating for variations in the thickness and surface level of the disc, said gimbal plate means structured to include link means constructed and positioned to provide distinct degrees of elasticity of said gimbal plate means in said two directions of rotation, said link means including at least six links in one direction of rotation to reduce elasticity in one of said two directions of rotation and to increase elasticity in the other of said two directions of rotation;
said gimbal plate means includes a support arm having a flexible gimbal portion mounted thereon, said magnetic head being mounted on said flexible gimbal portion;



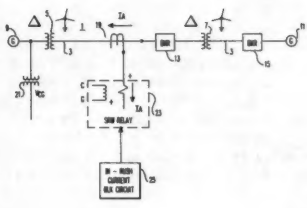
said gimbal portion includes a head fixing portion and an intermediate gimbal portion located about the periphery of said head fixing portion, said intermediate gimbal portion being flexibly attached to said support arm; and
said six links symmetrically arranged in at least a pair of links on opposite sides of said head fixing portion for connecting said head fixing portion to said intermediate gimbal portion, and said link means including at least two pairs of links in the other direction located on opposite sides of said intermediate gimbal portion for connecting said intermediate gimbal portion to said support arm.

4,876,624

APPARATUS FOR DETECTING UNSYMMETRICAL BIPOLAR WAVEFORMS

Kung C. Chow, Coral Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 13, 1988, Ser. No. 220,706
Int. Cl.[4] H02H *3/26*
U.S. Cl. 361—87 **12 Claims**



1. Apparatus for detecting a preselected unsymmetry bipolar waveforms of a predetermined frequency comprising:
means generating a pulse at each zero crossing of the bipolar waveform;
first circuit means generating a first signal of a first value for a first preselected interval in response to a pulse from the pulse generating means and generating a first signal having a second value otherwise;
second circuit means generating a second signal of a first value for a second preselected interval in response to the first signal going from the first value to the second value and having a second value otherwise, said first and second intervals being selected such that first and second signals have said second values simultaneously only when said bipolar waveform has at least said preselected unsymmetry; and
third circuit means responsive to the simultaneous presence

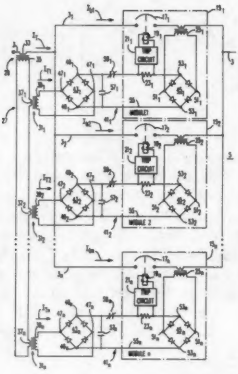
of said first signal of the second value and the second signal of the second value to generate an output signal indicative of said preselected unsymmetry of the bipolar waveform.

4,876,625

COMPOSITE CIRCUIT BREAKER SYSTEM

William R. Wolfe, Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 4, 1988, Ser. No. 267,133
Int. Cl.[4] H02H 3/08
U.S. Cl. 361—93 12 Claims



1. A composite circuit breaker system for a main electrical conductor carrying a total current, said composite circuit breaker system comprising:

means dividing the main conductor into a plurality of paralleled branch conductors, each of which carry a branch current which is a proportionate share of the total;

a separate circuit breaker connected in each branch conductor to selectively interrupt the branch current therein;

means associated with each circuit breaker generating a branch current signal representative of the current in the branch in which the circuit breaker is connected; and

means generating a signal representative of the total current signal for application to each circuit breaker;

said circuit breakers including circuit means responsive to both the branch current signal and the signal representative of the total current to interrupt said branch current when either of the branch current signal and the signal representative of the total current exceeds a specified value.

4,876,626

CENTRAL OFFICE PROTECTOR MODULE WITH ALARM INDICATOR

Richard Kaczmarek, Chicago, Ill., assignor to Reliance Comm/-Tec Corporation, Chicago, Ill.

Filed Jun. 3, 1988, Ser. No. 202,702
Int. Cl.[4] H02H 9/04
U.S. Cl. 361—119 16 Claims

1. A line protector for a communications circuit comprising:

(a) a housing having an end wall and an opening opposite to said end wall;

(b) an insulating member forming a base, said member closing said opening;

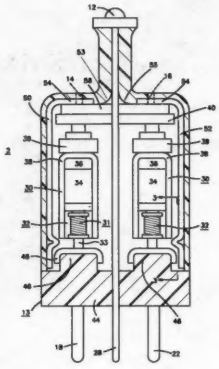
(c) at least one line pin projecting from said base;

(d) a ground terminal in said base;

(e) an alarm pin for connection to a source of voltage, said pin projecting from said base;

(f) at least one protection means communicating between said at least one line pin and said ground terminal, said protection means for providing an electrical connection between said line pin and said ground terminal upon the occurrence of any one of a predetermined number of conditions, said protection means permanently providing said electrical connection for at least one of said conditions;

(g) at least one alarm terminal associated with said protection means, said protection means electrically connecting said alarm terminal to said ground terminal when said



protection means permanently provides said electrical connection; and

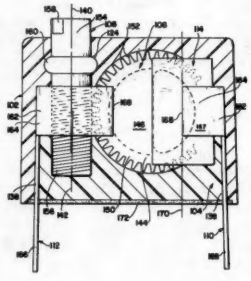
(h) electrically powered alarm indicating means having two terminals and mounted in said housing, said alarm terminal in electrical connection with one of said indicating means terminals and said alarm pin in electrical connection with the other of said indicating means terminals such that when said alarm pin is connected to said voltage source and said alarm terminal is electrically connected to said ground terminal current flows through said alarm indicating means to indicate an alarm.

4,876,627

VARIABLE ELECTRONIC COMPONENT

Martin A. Mittler, Lake Hiawatha, and Kenneth J. Scowen, Springfield, both of N.J., assignors to Voltronics Corporation, East Hanover, N.J.

Filed Apr. 6, 1989, Ser. No. 334,911
Int. Cl.[4] H01G 5/06
U.S. Cl. 361—293 28 Claims



1. A variable electronic component comprising a housing, a

rotor within said housing, said rotor having a contact portion and an impedance varying portion, rotating means for rotating said rotor, an impedance varying member arranged overlying a portion of said impedance varying portion, first contact means engaging said contact portion of said rotor without engaging said impedance varying member, and second contact means urging said impedance varying member into sliding contact with a portion of said impedance varying portion, whereby rotation of said rotor varies the extent of overlap between said impedance varying member and said impedance varying portion to provide a desired range of impedance characteristics to said component.

4,876,628

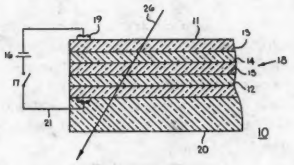
THIN FILM ION CONDUCTING COATING

Ronald B. Goldner, Lexington; Terry Haas, Sudbury; Kwok-Keung Wong, Watertown, and George Seward, Arlington, all of Mass., assignors to Tufts University, Medford, Mass.

Division of Ser. No. 93,782, Sep. 8, 1987, Pat. No. 4,832,463. This application Feb. 21, 1989, Ser. No. 312,196

Int. Cl.[4] H01G *4/06*; H01M *10/39*

U.S. Cl. 361—313 **5 Claims**



1. A storage battery comprising:

an electronically conductive substrate;

a first storage electrode on said substrate, said storage electrode comprising an ion conductive-electron conductive layer;

an ion conductive-electron resistive layer on said first storage electrode, said ion conductive-electron resistive layer being capable of transporting positive metal ions into said first storage electrode;

a second storage electrode on said ion conductive-electron resistive layer; and

an electronically conductive layer on said second storage electrode, said electronically conductive layer and said electronically conductive substrate being adapted for connection with an external voltage source, whereby when voltage of a first polarity is applied across said electronically conductive layer and said electronically conductive substrate, said positive metal ions are transported from said first storage electrode through said ion conductive-electron resistive layer and when voltage of a second polarity is applied across said electronically conductive layer and is electronically conductive substrate, said positive metal ions are transported through said ion conductive-electron resistive layer to said first storage electrode, said ion conductive-electron resistive layer comprising a mixture of lithium oxide and an oxide selected from the group consisting of: boron oxide, magnesium oxide, aluminum oxide, silicon oxide, calcium oxide, manganese oxide and zinc oxide.

4,876,629

UNDERGROUND CONTROL HOUSING

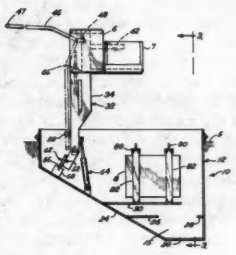
Michael R. Phillips, P.O. Box 1064, Benton Harbor, Mich. 49022

Filed Jun. 27, 1988, Ser. No. 211,579

Int. Cl.[4] H02B *1/20*

U.S. Cl. 361—391 **4 Claims**

1. A housing which stores controls below ground level wherein controls are contained wihtin a plurality of control boxes, said housing including a pair of side walls and a pair of end walls, and a bottom wall to define an enclosure, said housing including pivot means carried within said enclosure for lifting said control boxes out of said housing, said pivot means including an arm operatively connected to said control boxes at a proximal end thereof, and a distal end attached to said housing, said arm pivotable between a lowered storage position and a raised service position, at least one of said control boxes housing position sensitive equipment, said one control box supported within said enclosure and including latching means for detachably and pivotally connecting the one control box to said pivot means whereby said one control box remains in its original orientation as the arm is pivoted into its raised service position.



4,876,630

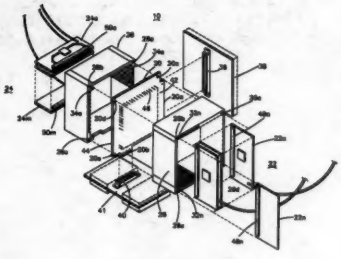
MID-PLANE BOARD AND ASSEMBLY THEREFOR

Prithipal Dara, Richardson, Tex., assignor to Reliance Comm/-Tec Corporation, Chicago, Ill.

Continuation of Ser. No. 65,025, Jun. 22, 1987, abandoned. This application Sep. 23, 1988, Ser. No. 250,974

Int. Cl.[4] H05K *01/18*

U.S. Cl. 361—413 **2 Claims**



1. An assembly comprising:

(a) a mid-plane board having first and second sides, said board allowing a first group of at least two circuit cards each having means for connection to said first side to be interconnected in any order to a second group of at least two circuit cards having means for connection to said second side, said mid-plane board comprising:

(i) a first group of at least four pins projecting outwardly on both said first and said second sides, at least two of said first group of pins being associated with a respective one of each of said first group and said second group connection means;

(ii) a second group of at least two pins projecting outwardly only on said first side, at least one of said first

side projecting only pins being associated with a respective one of said first group connection means; and

(iii) a third group of at least two pins projecting outwardly only on said second side, at least one of said second side projecting only pins being associated with a respective one of said second group connection means,

(b) a first housing having at least two card guide and support means each of said means associated with a respective one of said at least two first group circuit cards, each of said means allowing said associated one of said first group circuit cards connection means to be brought into contact with said associated ones of said first, second and third groups of pins when said associated ones of said first group circuit cards is inserted therein; and

(c) a second housing having at least two card guide and support means each associated with a respective one of said at least two second group circuit cards, each of said means allowing said associated ones of said second group circuit cards connection means to be brought into contact with said associated ones of said first, second and third groups of pins when said associated ones of said second group circuit cards is inserted therein,

said at least two card guide and support means of said first housing being in an orthogonal relationship to said at least two card guide and support means of said second housing, said mid-plane board, said first housing and said second housing including coaxially aligned means for assembling said assembly such that said first housing is attached to said mid-plane board first side and said second housing is attached to said mid-plane board second side when said assembly is assembled.

4,876,631

ELECTRIC DOUBLE LAYER CAPACITOR

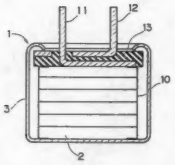
Masanori Endo, and Kouichi Watanabe, both of Kyoto, Japan, assignors to Murata manufacturing Co., Ltd., Japan

Filed Feb. 8, 1989, Ser. No. 308,111

Claims priority, application Japan, Feb. 9, 1988, 63-28125

Int. Cl.[4] H01G 9/00

U.S. Cl. 361—502 **4 Claims**



1. An electric double layer capacitor comprising:

first and second polarizable electrodes,

a separator disposed between said first and second polarizable electrodes, and

first and second current collectors in contact with said first and second polarizable electrodes, and

each of said first and second polarizable electrodes comprising an activated carbon electrode which is made from activated carbon obtained by subjecting a synthetic resin to flame resisting treatment and activating treatment and which contains a titanium compound whose amount is between 0 and 0.2 wt % in terms of Ti, and electrolyte.

4,876,632

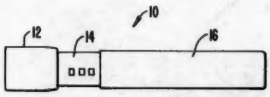
FLASHLIGHT WITH BATTERY LIFE INDICATOR MODULE

Ralph F. Osterhout, San Francisco; Paul L. Howard, Belmont, and Greta G. Light, San Mateo, all of Calif., assignors to Tekna, Inc., Redwood City, Calif.

Continuation-in-part of Ser. No. 147,795, Feb. 10, 1988, abandoned. This application Feb. 12, 1988, Ser. No. 155,426

Int. Cl.[4] F21L 9/00

U.S. Cl. 362—183 **22 Claims**



1. An apparatus for a flashlight comprising:

a tubular module having first and second ends;

means for coupling said first end to a flashlight head assembly:

means for coupling said second end to a battery holder assembly;

means for providing an electrical connection between said battery holder assembly and said flashlight bulb assembly:

an indicator mounted in said tubular module and visible from the exterior of said tubular module; and

circuit means for measuring a battery level and activating said indicator when said battery level passes a predetermined value.

4,876,633

LIGHTING SYSTEM

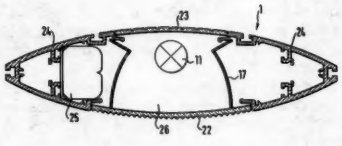
Hartmunt S. Engel, Schloss Heutingsheim, Freiberg am Neckar, Fed. Rep. of Germany 7141

Filed Dec. 22, 1987, Ser. No. 136,689

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1986, 3644335

Int. Cl.[4] F21S 3/00

U.S. Cl. 362—223 **1 Claim**



1. Elongate lighting unit for use in a modular lighting system for generating light band type structures, said lighting unit comprising:

an elongate carrier section having a cross-section resembling a double convex lens and being composed of two identically constructed, extruded, lateral profiled sections each having an essentially V-shaped cross-section with an apex and ends, defining a mouth, oposite to said apex;

means connecting said lateral profiled sections together at said ends with said apices forming respective longitudinal side edges of said lighting unit and with said mouths confronting each other but spaced apart from each other, whereby to form a central chamber between said lateral profiled sections and side chambers within said lateral profiled sections;

at least one fluorescent tube received within said central chamber;

functional means comprising a choke and electrical cables

and optionally other functional elements disposed in at least one of said side chambers;

said lateral profiled sections including continuous webs, and undercuts forming coupling connections with modular elements to be mounted in said central region above and below said at least one fluorescent tube, said modular elements comprising translucent covers, non-light permeable covers, shield arrays and scattering grids; and

reflectors provided to the sides of said at least one fluorescent tube with said reflectors extending across the mouths of the respective associated lateral profiled sections.

4,876,634

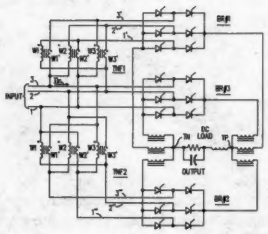
MULTI-PULSE CONVERTER SYSTEM

Derek A. Paice, Palm Harbor, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 1, 1988, Ser. No. 214,080

Int. Cl.[4] H02M 7/00

U.S. Cl. 363—5 **13 Claims**



1. A multiple AC/DC converter system comprising:

a regular polygon connected transformer having at least six successive windings defining successive tappings therebetween which constitute secondary tappings of the transformer;

alternate ones of said windings each having a mid-point tapping;

a three-phase primary power supply being supplied to said midpoint tappings which constitute primary tappings of the transformer;

said secondary tappings being respectively connected to six pairs of static-controlled rectifiers, each of said pairs being serially mounted across opposite polarity DC terminals;

wherein said secondary tappings belong to two sets of three tappings symmetrically disposed about said primary tappings, one set being oriented clockwise, the other set being oriented counterclockwise relative thereto;

whereby a voltage phase shift of predetermined magnitude relative to the voltage applied by the power supply is provided by three pairs of static-controlled rectifiers connected to said primary tappings, such phase shift being one polarity for one of said two sets of secondary tappings and opposite in polarity for the other of said two sets of secondary tappings.

4,876,635

SERIES RESONANT INVERTER WITH LOSSLESS SNUBBER-RESETTING COMPONENTS

John N. Park, Rexford; Robert L. Steigerwald, Burnt Hills, and Michael J. Schutten, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 23, 1988, Ser. No. 288,909

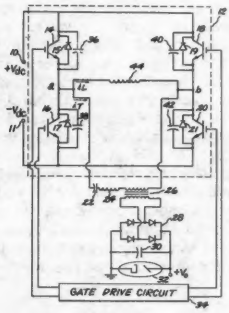
Int. Cl.[4] H02M 3/337, 7/5387

U.S. Cl. 363—17 **9 Claims**

1. An improved series resonant bridge inverter, comprising:

two pairs of controllable switch means, the switch means of each pair being connected in series and each pair of series-connected switch means being adapted to be connected in parallel across a DC supply;

a series resonant circuit connected between the junctions of the controllable switch means in each pair of controllable switch means and comprising a capacitor and an inductor, said series resonant circuit further having means for coupling the output of the resonant inverter to a load, said



controllable switch means providing a rectangular wave signal to said resonant circuit;

a snubber capacitor coupled across each of said controllable switch means; and

circuit means coupled to said series resonant circuit for drawing sufficient current to ensure that each said snubber capacitor is discharged before turning on the respective switch means coupled thereacross.

4,876,636

SWITCHING POWER SUPPLY HAVING AN EMERGENCY MODE REGULATING VOLTAGE ON THE PRIMARY SIDE

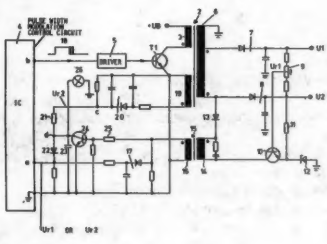
Gerard Rilly, Unterkirnach, and Jose-Ignacio Rodriguez, Villingen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,974

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1984, 3723484

Int. Cl.[4] H02M 3/335

U.S. Cl. 363—21 **12 Claims**



1. In a switching power supply including a transformer having a primary winding and a secondary winding, a switching transistor connected to said primary winding, a control circuit means, having a control input terminal and responsive to a regulating voltage at said control input terminal, for controlling the switching of said transistor for causing same to produce a pulsed voltage in said primary winding, rectifier circuit means, connected to said secondary winding, for pro-

ducing at least one operating voltage at its output, and further circuit means for generating a first regulating voltage from said at least one operating voltage, and for feeding said first regulating voltage to said control input terminal of said control circuit means to control same to stabilize said at least one operating voltage to a rated value; the improvement wherein said further circuit means for generating said first regulating voltage comprises means for producing a regulating voltage value proportional to said at least one operating voltage, means for producing a pulsed voltage, means for amplitude modulating said pulsed voltage with said regulating voltage value, a further transformer having first and second windings with said first winding being connected to receive the modulated pulsed voltage, and a rectifier connected between said second winding of said further transformer and said control input terminal; and further comprising an emergency regulating voltage circuit means for generating a second regulating voltage disposed on the primary side of said transformer, with said second regulating voltage having a value such that, when applied to said control input, it causes regulation of said at least one operating voltage to at most said rated value of said at least one operating voltage, and a switching circuit means for automatically switching said second regulating voltage to said control input terminal in the absence of said first regulating voltage.

4,876,637

POWER CONVERTER AND METHOD OF CONTROLLING THE SAME

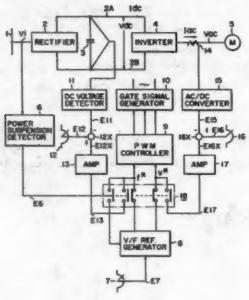
Tadao Mose, Tachikawa; Yasuhiro Andoh, Hachioji, and Tatuhisa Kitasin, Fuchu, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 21, 1989, Ser. No. 326,647

Claims priority, application Japan, Mar. 22, 1988, 63-65651; Apr. 5, 1988, 63-83145

Int. Cl.[4] H02M 5/458

U.S. Cl. 363—37 **16 Claims**



1. A power converter for converting AC input power into DC power and converting the DC power into AC output power to which a load is connected, said power converter comprising:

control means for controlling power converting operation of said power converter;

DC voltage detector means for detecting a DC voltage of the DC power to provide a DC voltage signal;

first reference generator means for generating a first reference;

output detector means for detecting a condition of the AC output power to provide an output condition signal;

second reference generator means, coupled to said output detector means, for generating a second reference in response to said output condition signal;

condition detector means for detecting a condition of the AC input power to provide an input condition signal; and

selector means, coupled to said condition detector means and said control means, for supplying said second reference to said control means when said input condition signal is provided.

4,876,638

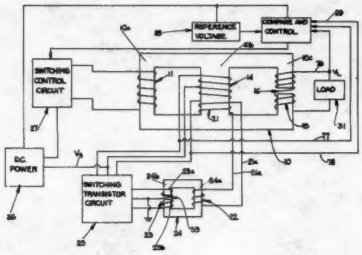
LOW-NOISE SWITCHING POWER SUPPLY HAVING VARIABLE RELUCTANCE TRANSFORMER

Donald M. Silva, West Lafayette; Leroy F. Silva, Lafayette, and Fred M. Fehsenfeld, Sr., Indianapolis, all of Ind., assignors to Electronic Research Group, Inc., West Lafayette, Ind.

Filed Feb. 10, 1988, Ser. No. 154,863

Int. Cl.[4] H02M 3/337

U.S. Cl. 363—97 **17 Claims**



1. A low-noise switching power supply for producing a regulated output voltage from an unregulated supply including a non-saturating main transformer having a core with a variable reluctance path, a load winding associated with said core for producing said output voltage, means for producing from said unregulated supply an alternating magnetic flux in said core so as to produce said output voltage from said load winding, and means for varying the reluctance of at least a portion of said transformer core so as to maintain said output voltage at a substantially constant predetermined value, said transformer having a high leakage reactance whereby noise, pulses and voltage spikes are effectively isolated from said means for producing alternating magnetic flux and said load winding, said transformer further comprising first, second, and third legs, said third leg including an air gap therein, wherein the reluctance of a path through said second and third legs is greater than the reluctance of a path through said first and second legs, said load winding being associated with said third leg, said means for producing an alternating magnetic flux comprising a primary winding associated with said second leg and switching means responsive to the unregulated supply for providing an oscillating voltage of substantially constant frequency to said primary winding, whereby a voltage is induced in said primary winding and magnetic flux is produced by alternating voltage acting upon said primary coil.

4,876,639

METHOD AND CIRCUITRY FOR CAUSING SIXTEEN BIT MICROPROCESSOR TO EXECUTE EIGHT BIT OP CODES TO PRODUCE EITHER INTERNAL SIXTEEN BIT OPERATION OR INTERNAL EIGHT BIT OPERATION IN ACCORDANCE WITH AN EMULATION BIT

William D. Mensch, Jr., 1924 E. Hope St., Mesa, Ariz. 85203

Division of Ser. No. 675,831, Nov. 28, 1984, Pat. No. 4,739,475, which is a continuation-in-part of Ser. No. 534,181, Sep. 20, 1983, Pat. No. 4,652,992. This application Apr. 6, 1988, Ser. No. 178,429

Int. Cl.[4] G06F 9/22, 9/36, 9/44

U.S. Cl. 364—200 **10 Claims**

1. A method of operating a 2^Nbit microprocessor comprising the steps of:

(a) setting an emulation bit in a status register in the 2^Nbit microprocessor to a first logical level;

(b) setting levels of a memory width bit and a register width bit in the status register to first logic levels in response to the first logic level of said emulation bit;

(c) loading a 2^{N-M}bit op code in an instruction register, said op code being one of a set of 2^{N-M} bit op codes that includes all of the op codes of a different 2^{N-M} bit microprocessor, and also loading the emulation bit into the instruction register;

(d) decoding the 2^{N-M} bit op code and the emulation bit in the instruction register to produce a first group of transfer signals that are useful for effectuating 2^N bit information transfers between various registers and buses of said 2^N bit microprocessor; and

(e) further decoding certain ones of said first group transfer signals and said memory width bit and said register width bit to produce a second group δf transfer signals that are useful in effectuating 2^{N-M} bit information transfers between various buses and registers and arithmetic logic units of said 2^N bit microprocessor,

said first and second groups of transfer signals causing said 2^N bit microprocessor to emulate said 2^{N-M} bit microprocessor when said emulation bit has said first level by executing a same set of instructions as said 2^{N-M} bit microprocessor, wherein N and M are integers and N is greater than M.

4,876,640

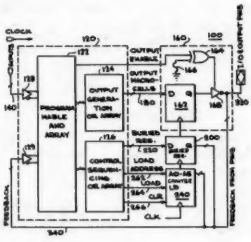
LOGIC CONTROLLER HAVING PROGRAMMABLE LOGIC "AND" ARRAY USING A PROGRAMMABLE GRAY-CODE COUNTER

Kapil Shankar, and Om Agrawal, both of San Jose, Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 7, 1986, Ser. No. 827,840

Int. Cl.[4] H03K *19/177, 21/38;* G06F *7/00*

U.S. Cl. 364—200 **12 Claims**



1. A logic device having both a plurality of external terminals and a plurality of device input/output ports, comprising:

a programmable array responsive to signals applied to said external terminals of said device for generating a plurality of logic signals;

a plurality of programmable output cells connected to said programmable array, each receiving programmably selectable ones of said logic signals from said programmable array, for generating a signal therefrom to a predetermined one of said device input/output ports;

a plurality of storage cells operatively connected to said programmable array, each receiving programmably selectable ones of said logic signals, for storing predetermined ones of said logic signals and for generating a signal therefrom; and

a programmable counter connected to said programmable array to receive programmably selectable ones of said logic signals for storing a count value and selectably incrementing or decrementing said count value, to generate counting signals;

said programmable array further responsive to said signals generated by predetermined ones of said programmable output cells, said storage cells and said counter for determining next-state logic signals; wherein said plurality of logic signals generated by said programmable array includes a plurality of load address signals and a load control signal and wherein said programmable counter, in responsive to receipt of said load control signal, replaces its contents with said load address signals.

4,876,641

VLSI DATA PROCESSOR CONTAINING AN ARRAY OF ICS, EACH OF WHICH IS COMPRISED PRIMARILY OF AN ARRAY OF PROCESSING

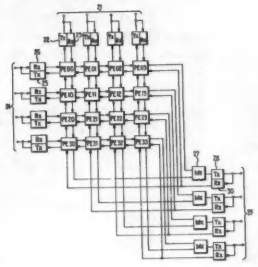
Colin H. Cowley, Stalybridge, Great Britain, assignor to Active Memory Technology Ltd., Reading, England

Filed Jul. 31, 1987, Ser. No. 80,300

Claims priority, application United Kingdom, Aug. 2, 1986, 8618943

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **5 Claims**



1. Data processing apparatus comprising:

(a) a plurality of integrated circuit chips each comprising a plurality of data processing elements,

(b) means for connecting said processing elements on all the chips together to form an array of rows and columns, allowing transfer of data between adjacent elements in each row and column,

(c) first switching logic means within each chip for subdividing each row/column into a first plurality of sections, all said processing elements in each individual section being on the same chip, and for interconnecting first and last processing elements in each said section to allow data to be shifted cyclically through said processing elements in that section, and

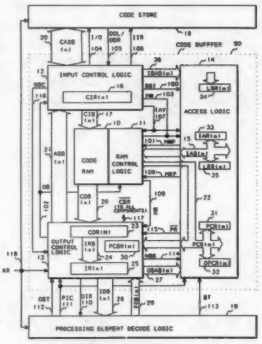
(d) second switching logic means external to the chips for subdividing each row/column into a second plurality of sections, each of which contains processing elements from at least two different ones of said chips, and for interconnecting first and last processing elements in each section to allow data to be shifted cyclically through said processing elements in that section.

4,876,642

RULES AND APPARATUS FOR A LOOP CAPTURING CODE BUFFER THAT PREFETCHES INSTRUCTIONS

Glenn A. Gibson, 4824 Ballerina, El Paso, Tex. 79922

Filed Jan. 19, 1988, Ser. No. 144,948
Int. Cl.[4] G06F *9/38*
U.S. Cl. 364—200 20 Claims



1. Code buffer apparatus for accepting processor instructions from a code store and transferring said processor instructions to a processing element, said code buffer comprising:

a random access memory containing P elements;

an input address register;

a program counter register;

input transfer means for transferring said processor instructions from said code store to said random access memory at a location addressed by said input address register;

output transfer means for transferring said processor instructions at a location addressed by said program counter register from said random access memory to said processing element;

input access logic means for controlling said input transfer means to block transfer into said random access memory when said input address register addresses a location that is occupied by an unprocessed instruction or when said input address register addresses a location that is within an unprocessed instruction loop; and

output access logic means for controlling said output transfer means to block transfer out of said random access memory when said program counter register does not address an unprocessed instruction or said program counter register does not address an instruction within an unprocessed instruction loop.

4,876,643

PARALLEL SEARCHING SYSTEM HAVING A MASTER PROCESSOR FOR CONTROLLING PLURAL SLAVE PROCESSORS FOR INDEPENDENTLY PROCESSING RESPECTIVE SEARCH REQUESTS

Kevin M. McNeill, and Takeshi Ozeki, both of Tucson, Ariz., assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

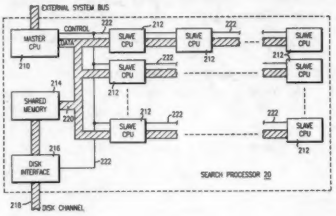
Filed Jun. 24, 1987, Ser. No. 66,129
Int. Cl.[4] G06F *7/06, 13/40, 9/28, 15/16*
U.S. Cl. 364—200 3 Claims

1. A parallel processing search system for searching and updating a database at the request of a host system, comprising:

a master processor connected to a host system bus for transfer of information between said master processor and said host system bus;

a data bus connected to said master processor;

plural slave processors connected to said data bus for independently processing respective search requests under the control of said master processor, said slave processors also connected to said master processor via control lines, said master processor independently and dynamically programming said slave processors to perform match comparison processing of search patterns based on requests from said host system to said master processor, wherein those slave processors programmed by said master processor perform match comparison processing under the control of said master processor and each programmed slave processor signals said master processor when the search



pattern with which the respective slave processor was programmed is matched with data on said data bus;

a disk drive interface connected to a disk which stores a database via a disk channel connecting the disk drive to the disk;

a buffer memory connected to the data bus and the disk drive for storing of the database retrieved from the disk via the disk drive and for sequentially placing data from the database on the data bus for match comparison by said slave processors so that a search of the database can be made by said slave processors, said buffer memory being controlled by said master processor to store update data transferred by said host to said master processor and to transfer an updated database to said disk via said disk drive interface.

4,876,644

PARALLEL PIPELINED PROCESSOR

David W. Nuechterlein, and Mark A. Rinaldi, both of Durham, N.C., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 115,150, Oct. 30, 1987, abandoned.
This application Mar. 28, 1989, Ser. No. 331,021
Int. Cl.[4] G06F *9/28, 9/38*
U.S. Cl. 364—200 2 Claims

1. A computer system comprising: at least two processors each including;

arithmetic logic unit means for receiving input information signal elements and providing output information signal elements,

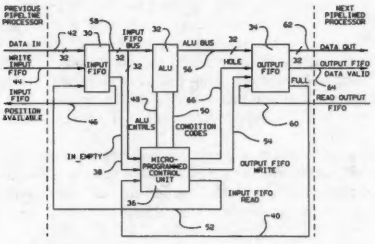
a first-in first-out output register stack means having a plurality of output data lines and a plurality of input data lines, said input data lines being connected to said arithmetic logic unit means for receiving output information signal elements therefrom and storing the same in the register stack,

a program control unit connected to said arithmetic logic unit means for controlling the operation of said arithmetic logic unit and to the first-in first-out output register stack for providing neutral value information elements which are interspersed in said stack with the information ele-

ments from the arithmetic logic unit means all under control of the program control unit,

said program control units being programmed such that in each corresponding address in the respective first-in first-out output register stack means not more than one program control unit can control the transfer of output information signal elements from its arithmetic logic unit to its stack means and all other program control units will supply neutral value information elements to the corresponding addresses in their first-in first-out output register stack means; and

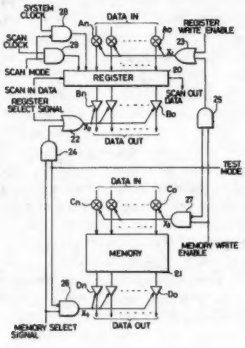
means connecting the respective output data lines of the said at least two first-in first-out output register stack means in parallel whereby during predetermined cycles of operation of said computer system output information signal elements from no more than one said first-in first-out output register stack are provided by said parallel connected output data lines.



4,876,645
DIAGNOSTIC SYSTEM

Katsuhiko Shioya, Tokyo; Tetsuhiko Ifuku, Machida, and Seiichi Inamasu, Kumamoto, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 815,197, Dec. 27, 1985, abandoned, which is a continuation of Ser. No. 467,772, Feb. 18, 1983, abandoned. This application Mar. 16, 1987, Ser. No. 27,117
Claims priority, application Japan, Feb. 24, 1982, 51-28641
Int. Cl.[4] G06F *11/22*
U.S. Cl. 364—200 **3 Claims**



1. A data processor logic unit diagnostic system, comprising:

a logic unit;

memory means, connectable via memory control means to said logic unit to establish a first data path between said logic unit and said memory means, for storing process data to be processed by said logic unit;

register means, connectable via register control means to said logic unit to establish a second data path, distinct from said first data path, between said register means and said logic unit, for storing test data for testing said logic unit;

said memory control means being responsive to memory means input/output control signals for connecting said first data path,

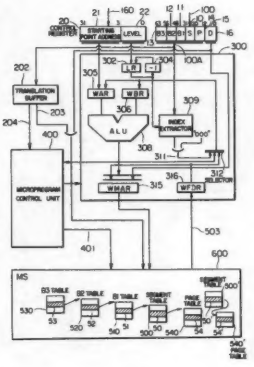
said register control means being responsive to register means input/output control signals for connecting said second data path; and

converting means for receiving input/output control signals for the memory means and passing said input/output control signals for the memory means as either said memory means input/output control signals or said register means input/output control signals in response to respective states of a test signal.

4,876,646
DATA PROCESSOR HAVING MULTILEVEL ADDRESS TRANSLATION TABLES

Shizuo Gotou; Toyohiko Kagimasa, both of Hachioji, and Seiichi Yoshizumi, Hino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,189
Claims priority, application Japan, Dec. 24, 1984, 270878
Int. Cl.[4] G06F *9/20, 9/00*
U.S. Cl. 364—200 **3 Claims**



1. An information processing system, comprising:

a group of address translation tables in a multi-level configuration of greater than two levels for translating virtual addresses into corresponding real addresses, each one of said address translation tables not in the lowest level of said multi-level configuration containing a plurality of entries each of which points to a starting address of another address translation table, the former table being in a higher level than the latter table in said multi-level configuration and one of said address translation tables in the lowest level of said multi-level configuration having real address data signals to be provided as a result of address translation of a virtual address into a real address by said group of address translation tables;

a virtual address register for holding virtual address data to be transformed into real address data, said virtual address register comprising a plurality of data fields, each data field corresponding to one of said levels, and said virtual address data occupying a respective number of data fields among said plurality of data fields depending upon the data length of said virtual address data;

a control register for holding starting address data and level data, said level data indicating the level of the highest level address translation table required to translate the virtual address data held by said virtual address register into corresponding real address data, and said starting address data indicating a starting address of the highest level address translation table as indicated by said level data; and

means connected to said virtual address register and said control register for sequentially accessing plural address translation tables starting from the address translation table indicated by said level data in said control register, and going down to address translation tables at the levels lower than the level indicated by said level data, said accessing being effected on the basis of the starting address indicated by said starting address data and data in said data fields of said virtual address register.

4,876,647

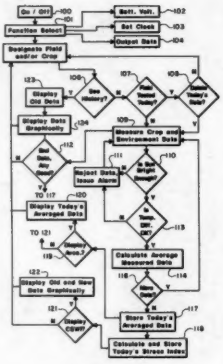
APPARATUS FOR DETERMINING WATER STRESS IN CROPS

Bronson Gardner, Garfield Heights; Melvin E. Keener, Chagrin Falls; Steven C. DeSutter; Carl T. Jagatich, both of Aurora, and Ralph A. Felice, Macedonia, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 9,991, Feb. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 735,798, May 17, 1985, Pat. No. 4,755,942. This application Feb. 9, 1987, Ser. No. 12,016

Int. Cl.[4] G06F *15/20*; A01G *25/16*

U.S. Cl. 364—420 **33 Claims**



1. A portable apparatus for determining the water stress condition of an agricultural crop growing in a field comprising:

a first, pistol shaped housing carrying a plurality of sensor means for sensing a group of crop and field conditions, including air temperature, crop canopy temperature, relative sunlight intensity and relative humidity, and for generating a group of electrical sensor signals including a sensor signal indicative of each of said conditions, said pistol shaped housing having barrel means for aiming said crop canopy temperature sensor means carried by said housing at a crop and having pistol grip including trigger switch means for actuating said control means to receive said sensor signals, and wherein said relative sunlight sensor comprises at least two photoresponsive electronic devices, each device having a light-receiving surface, said surfaces being disposed at an obtuse angle relative to each other, whereby sensed sunlight intensity is relatively independent for different orientations of said barrel means;

a second housing carrying control means interconnected to said sensor means for controllably receiving said sensor signals and for calculating, in said field using said sensor signals, at least one water stress index or a particular crop;

operator input means, carried by at least one of said first and second housings and interconnected to said control means, for selectively controlling receipt of said sensor signals by said control means, said operator input means including said trigger switch means; and

display means, carried by said second housing and interconnected to said control means, for visually displaying in said field the at least one calculated crop water stress index.

9. An apparatus for determining the water stress condition of an agricultural crop growing in a field comprising:

a first housing carrying a plurality of sensor means for sensing a group of crop and field conditions, including air temperature, crop canopy temperature and relative humidity, and for generating a group of electrical sensor signals including a sensor signal indicative of each of said conditions;

a second housing carrying control means interconnected to said sensor means for controllably receiving said sensor signals and for calculating, in said field using said sensor signals, at least one water stress index for a particular crop;

operator input means, interconnected to said control means, for selectively controlling receipt of said sensor signals by said control means;

first display means, carried by said second housing and interconnected to said control means, for visually displaying the at least one calculated crop water stress index; and

second display means, carried on said first housing interconnected to said control means, for visually displaying in said field the difference between the sensed crop canopy and air temperatures.

18. An apparatus for determining the water stress condition of an agricultural crop growing in a field comprising:

a plurality of sensor means for sensing a group of crop and field conditions, including air temperature, a crop canopy temperature and relative humidity, and for generating a group of electrical sensor signals including a sensor signal indicative of each of said conditions;

control means interconnected to said sensor means for controllably receiving said sensor signals and for calculating, using said sensor signals, at least one water stress index for a particular crop, said control means including memory means for storing, for a particular operator-identified field in which a crop is growing, at least two calculated water stress indices, each of said at least two indices having been calculated from crop and field conditions sensed on a different day and for storing with each of said indices their respective dates of said crop and field condition sensing;

operator input means interconnected to said control means, for selectively controlling receipt of said sensor signals by said control means; and

display means, interconnected to said control means, for visually displaying said at least two indices graphically as a function of the date of crop and field condition sensing.

24. An apparatus for determining the water stress condition of an agricultural crop growing in a field comprising:

a plurality of sensor means for sensing a group of crop and field conditions, including air temperature, crop canopy temperature and relative humidity, and for generating a group of electrical sensor signals including a sensor signal indicative of each of said conditions;

control means interconnected to said sensor means for controllably receiving said sensor signals and for calculating, using said sensor signals, at least one water stress index for a particular crop, said control means including means for comparing a function of at least one sensed condition indicated in a said group of sensor signals with at least one limit value for said sensed condition and for rejecting said group of sensor signals when said function of at least one condition falls outside said at least one limit value;

operator input means, interconnected to said control means,

for selectively controlling receipt of said sensor signals by said control means; and

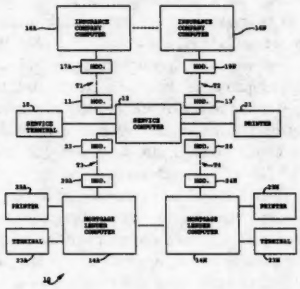
display means, interconnected to said control means, for visually displaying the at least one calculated crop water stress index.

4,876,648

SYSTEM AND METHOD FOR IMPLEMENTING AND ADMINISTERING A MORTGAGE PLAN

Clarke B. Lloyd, 4710 N. Marine Dr., Ste. 23A, Chicago, Ill. 60613

Filed Jan. 12, 1988, Ser. No. 143,003
Int. Cl.[4] G06F *15/00*; G06G *7/52*
U.S. Cl. 364—408 **43 Claims**



1. A system for implementing a mortgage plan, comprising:

lender computer means;

service computer means for storing borrower information and for storing groups of investment information;

said service computer means including means for receiving said borrower information and said groups of investment information;

means for selecting an individual one of said groups of investment information;

means responsive to said borrower information and to the selected one of said group of investment information for determining a desired amount of investment funding to help repay a mortgage plan structured according to the stored mortgage information; and

means for generating mortgage implementing information for a given mortgage based on the determined amount of funding and for sending said mortgage implementing information to said lender computer means to facilitate the establishment of a mortgage plan.

4,876,649

HARM PREVENTING APPARATUS FOR VEHICLE

Tanetchi Kawai, Anjo; Tomio Yasuda, Kasukabe, and Koji Aoki, Kawasaki, all of Japan, assignors to Aisin Seiki Kabushikikaisha, Aichi, Japan

Filed May 4, 1987, Ser. No. 46,006
Claims priority, application Japan, May 6, 1986, 61-103688; May 6, 1986, 61-103689; Aug. 19, 1986, 61-193835
Int. Cl.[4] B60R *25/00*
U.S. Cl. 364—424.05 **70 Claims**

1. A harm preventing apparatus for vehicle comprising

first detecting means for detecting the presence or absence of an occupant onboard a vehicle;

second detecting means for detecting an open/closed condition of a door of the vehicle;

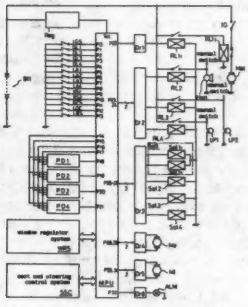
an onboard door lock mechanism;

unlock means for unlocking the onboard door lock mechanism;

third detecting means for detecting the operation of the unlocking means upon the onboard door lock mechanism;

and means for establishing a harm preventive mode in response to the detection of the absence of an occupant by the first detecting means and to the detection of the closed condition of the door by the second detecting means and for terminating the harm preventive mode in response to the detection of the operation of the unlocking means by the third detecting means;

said means for establishing a harm preventive mode includes running distance detecting means for detecting the distance through which the vehicle has run, and establishes the harm preventive mode in response to the detection of



a given distance run by the vehicle by the running distance detecting means after the detection of the absence of an occupant by the first detecting means and the detection of the closed condition of the door by the second detecting means and before the detection of the operation of the unlocking means by the third detecting means;

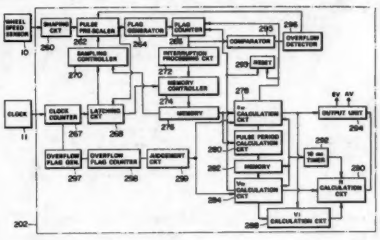
wherein said harm preventive mode comprises a theft monitoring mode which includes means for monitoring said first, second and third detecting means and a theft detecting mode which includes means for energizing alarm means when the harm preventive mode is established.

4,876,650

ANTI-SKID AUTOMOTIVE BRAKE CONTROL SYSTEM INCLUDING WHEEL DECELERATION CALCULATION WITH SHORTER LAG-TIME AND METHOD FOR PERFORMING CALCULATION

Jun Kubo, Hino, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 601,344, Apr. 17, 1984, abandoned. This application Feb. 5, 1988, Ser. No. 152,856
Claims priority, application Japan, Apr. 23, 1983, 58-70896
Int. Cl.[4] B60T *8/34*
U.S. Cl. 364—426.02 **26 Claims**



1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake circuit including a wheel cylinder for applying braking force to a vehicle wheel;

a pressure control valve disposed within said hydraulic brake circuit and operative for increasing fluid pressure in said wheel cylinder in a first position thereof and for decreasing the fluid pressure in the wheel cylinder in a second position thereof;

a wheel speed sensor means for detecting rotational speed of said vehicle wheel and producing sensor signal pulses separated by intervals, said intervals representative of the detected wheel rotation speed;

a timer means for producing a timer signal;

a first means for sampling a value of said timer signal in response to a given number of said sensor signal pulses, and storing the sampled time signal value as input timing data, said input timing data including successively sampled first, second and third timer signal values;

a second means for determining said given number of sensor signal pulses based on an interval between occurrence of one sensor signal pulse at which said first timer signal value is sampled and an immediately preceding sensor signal pulse occurring immediately before the occurrence of said one sensor signal pulse in such a manner that the intervals over said given number of sensor signal pulses becomes greater than a predetermined value, said second means triggering said first means for sampling said second timer signal value after given number of said sensor signal pulses as counted from said one sensor signal pulse, and sampling said third timer signal value after the given number of said sensor signal pulses as counter from the sensor signal pulse at which said second timer value is sampled;

a third means for processing the stored timer signal values to produce a control signal to operate said pressure control valve at one of said first and second positions so as to maintain a slip rate at approximately optimum value, said third means being operative for deriving a wheel acceleration based on said first, second and third timer values; and

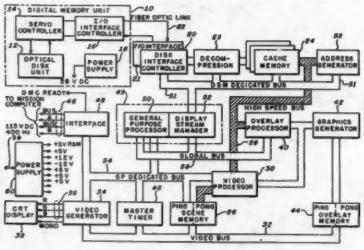
a fourth means, associated with said first and third means, for interrupting operation of said third means hen said first means is active for sampling said first, second and third timer signal values.

4,876,651

DIGITAL MAP SYSTEM

John F. Dawson, Albuquerque, N. Mex.; Eldon J. Thompson, Ruckersville, Va., and James A. Cousens, Albuquerque, N. Mex., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 11, 1988, Ser. No. 192,798
Int. Cl.[4] G01S 7/44, 7/04
U.S. Cl. 364—449 **70 Claims**
MICROFICHE APPENDIX INCLUDED
(1 Microfiche, 44 Pages)



1. Digital mapping display system for an aircraft, wherein said aircraft includes a mission computer for generating digital signals indicative of the aircraft's present longitude and latitude coordinate positions, a heading signal indicative of the angular direction of motion, and signals corresponding to map data and graphical data, further including a mass memory unit for storing said map data signals in digital form representative of a map of territory overflown by the aircraft and for providing map data signals corresponding thereto, and for storing overlay data in digital form representative of graphical information to be superimposed on said map data, and for providing overlay data signals corresponding thereto, said display system comprising:

mass data controller means for extracting said map data signals or said overlay data signals from said mass memory unit and periodically providing updated images,

cache memory means coupled to said mass data controller means for electronically storing digital data indicative of a portion of a complete map of territory overflown by and surrounding said aircraft, said cache memory means comprised of an array of storage segments, the number of said storage segments being substantially less than the number of segments necessary to store an image representative of a complete map of territory and greater than that necessary to store an image of said portion of a complete map for any orientation of said aircraft, each such segment being randomly positionally programmable along predetermined X and Y coordinates corresponding to latitude and longitude of said complete map of territory, and responsive to means for dynamically relocating said positions in a predetermined physical address space with respect to changes in said aircraft's coordinate position and orientation, said storage segments configured in a logical Cartesian coordinate array corresponding to said portion of said complete map of territory, each of said segments comprised of a plurality of storage elements wherein each of said storage elements stores at least one bit of digital map data and wherein each storage location has a corresponding address, and further comprising segment mapping means responsive to an address command for storing an address representative of the location of each segment within said physical address space and the location of each storage element within each segment,

first control processor means responsive to said signals generated by said mission computer and for transmitting status signals to said mission computer, and further providing display mode commands and mass memory control data,

second control processor means responsive to said first control processor means for retrieving said map and data overlay signals from said mass memory unit in accordance with said aircraft's coordinate position, for providing control signals for periodically storing said updated images derived from said mass memory unit into said cache memory means, and for controlling data display,

address generator means responsive to control signals from said second control processor means for reading and extracting map data or overlay data from said cache memory means, and transferring said data in the form of displayable pixels to first or second memory means,

video generator means, responsive to digital outputs of said first and second memory means, for converting said map data pixel signal and said overlay data pixel signal to signals displayable in color or monochrome form, and

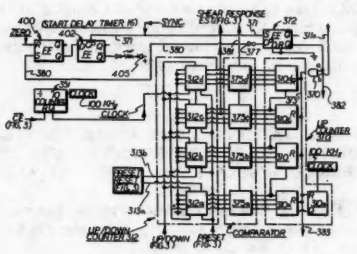
display means coupled to said video generator means and responsive to said map data and overlay data pixel signals and to a source of timing signals for providing a displayable image at a predetermined frame rate, said image corresponding to at least said portion of said complete map of territory.

4,876,652

APPARATUS AND METHOD FOR CONTROLLING THE SHEAR MECHANISM OF A GLASSWARE FORMING MACHINE

E. Boyd Gardner, Bloomfield, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Continuation of Ser. No. 76,239, Jul. 21, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 273,116
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—473 2 Claims



1. A control system for controlling the operation of a shear mechanism which is repetitively cycled to cut identically sized gobs from a runner of molten glass to be formed into containers in a glass machine which has, means for generating sync signals, comprising shear mechanism means for cutting discrete gobs from a runner of molten glass when displaced from a retracted position to an advanced position,

means for displacing said shear mechanism means,

start delay timer means for starting said displacing means after a timed start delay,

means for generating a shear mechanism return signal to return the shear mechanism from its advanced position to its retracted position,

first means for calculating a first time offset between a return signal and a later occurring sync signal,

second means for calculating a second time offset between a return signal and an earlier occurring sync signal, and

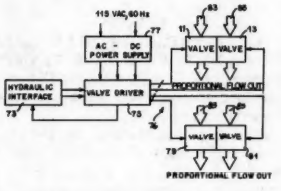
means for offsetting said start delay timer means by said first or second time offset so that said control system will be resynchronized each cycle of said shear mechanism.

4,876,653

PROGRAMMABLE MULTIPLE BLENDER

John S. McSpadden, 1008 Wharton St.; Russel D. Leatherman, 8P Woodstream La., both of Greensboro, N.C. 27410, and Harold R. Young, 1489 Old Coach Rd., Kernersville, N.C. 27284

Filed Jul. 15, 1987, Ser. No. 73,974
Int. Cl.[4] G05D *11/13*
U.S. Cl. 364—479 31 Claims



1. A system for blending low and high octane gasoline, comprising:

nozzle means for dispensing the blended gasoline, said nozzle means including blend manifold means having a first port for receiving low octane gasoline, a second port for receiving high octane gasoline, and a mixing chamber for blending received high and low octane gasoline together just prior to dispensing;

a first flow path for delivery of said low octane gasoline from a source thereof to said first port;

a second flow path, wholly independent of and isolated from said first flow path, for delivery of said high gasoline fuel from a source thereof to said second port;

first flow control means responsive to a first control signal for controlling the rate of flow of gasoline in said first flow path;

second flow control means responsive to a second control signal for controlling the rate of flow of gasoline in said second flow path;

blend selection means for producing a blend set point signal indicative of a desired blend ratio of said low and high octane gasoline; and

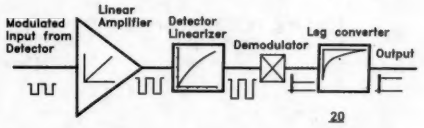
processor means responsive to the flow of said low and high octane gasolines for producing, after a predetermined initial volume of gasoline has been dispensed, said first and second control signals at any given time as a function of a comparision of the ratio of the actual accumulated volume of said low octane gasoline to said high octane gasoline, relative to a statistically determined ratio of the ideal volume of said low octane gasoline to said high octane gasoline for the total actual accumulated volume of the sum of the low and high octane gasoline at a given time, said processor means including means responsive to said blend set point signal for producing an idealized ratio equivalent to at a given time what the accumulated volumes of said low and high octane gasolines must be for providing said selected blend.

4,876,654

TRUE RMS POWER DEMODULATION SYSTEM AND METHOD FOR A MODULATED RF SIGNAL

Bret A. Herscher, Mountain View, Calif., assignor to Wavetek Microwave, Inc., Sunnyvale, Calif.

Filed Apr. 1, 1988, Ser. No. 176,717
Int. Cl.[4] G01R *23/00*; H03D *1/04*
U.S. Cl. 364—483 26 Claims



1. A method for true RMS power demodulation of an input signal comprising the steps of:

detecting said input signal to provide a detected signal;

linearly amplifying said detected signal to produce an amplified signal;

linearizing said amplified signal to provide a converted signal; and,

demodulating said converted signal to provide a demodulated signal.

4,876,655

METHOD AND APPARATUS FOR EVALUATING JITTER

Dale E. Carlton, Portland; Clifford E. Baker, Aloha, and Ronald M. Henricksen, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Dec. 2, 1985, Ser. No. 803,186
Int. Cl.[4] G06F *15/74*; G01D *9/00*; G06K *9/46*
U.S. Cl. 364—487 7 Claims

1. Apparatus for observing the distribution with respect to time of an event defined by the magnitude of a repetitive input

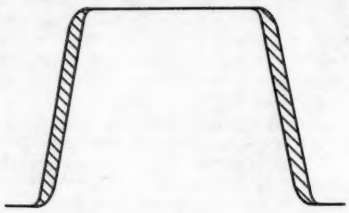
signal being within a predetermined band of values which is smaller than the dynamic range of the input signal, comprising:

trigger means responsive to the input signal for generating a trigger signal at a selected trigger point during each repetition of the input signal,

means for generating an n-bit digital timing signal,

timing means response to the trigger signal and the timing signal for generating a sample signal during each repetition of the input signal at a time that follows the time of occurrence of the trigger signal by an interval that depends on the timing signal,

sampling and comparison means responsive to the sample



signal for sampling the repetitive input signal and generating a memory enable signal if the sampled magnitude of the input signal falls within said predetermined band of values,

memory means having 2^n separately addressable memory locations corresponding respectively to the 2^n possible values of said timing signal, and

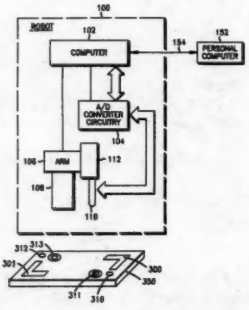
control means for causing the contents of a memory location of the memory means to be incremented by one unit if the sampling and comparison means generate a memory enable signal in response to a sample signal that is associated with the timing signal value to which the location corresponds.

4,876,656

CIRCUIT LOCATION SENSOR FOR COMPONENT PLACEMENT APPARATUS

John L. Leicht, Hawthorn Woods, and Jeffrey D. Leitheiser, Crystal Lake, both of Ill., assignors to Motorola Inc., Schaumburg, Ill.

Filed Aug. 28, 1987, Ser. No. 90,997
Int. Cl.[4] G01B *11/03*
U.S. Cl. 364—491 **10 Claims**



1. Component placement apparatus including processing means and a robot arm for placing components on a circuit board having at least one circuit element thereon with first and second edge portions, the processing means producing a control signal for positioning the robot arm and producing a strobe signal when the robot arm is positioned, said component placement apparatus further comprising:

sensing means attached to the robot arm and including a light source producing light for illuminating the circuit board and an optical reflective light sensor for producing an output signal having a magnitude proportional to the light reflected from the illuminated circuit board; and

converting means coupled to said sensing means for converting said output signal to a digitized signal in response to the strobe signal; and

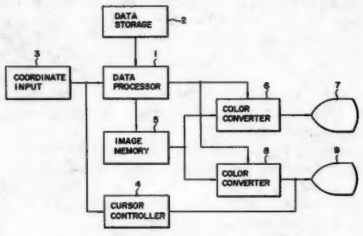
said processing means coupled to the robot arm for producing the control signal to step said sensing means across said at least one circuit element and coupled to the converting means for processing the digitized signal produced at each step for detecting the location of said at least one circuit element on the circuit board.

4,876,657

PRESENTATION DISPLAY APPARATUS FOR DISPLAYING TWO DIFFERENT IMAGES ON SEPARATE DISPLAYS FOR A LISTENER AND A SPEAKER

Mitsuo Saito, Yokosuka; Tsukasa Matoba, Kawasaki, and Toshio Okamoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 5, 1987, Ser. No. 81,747
Claims priority, application Japan, Aug. 15, 1986, 61-191254
Int. Cl.[4] G06F *15/626*
U.S. Cl. 364—521 **16 Claims**



5. A presentation display apparatus comprising:

image memory means for storing color image data of one screen image including listener's image data of a plurality of color components and speaker's image data of a single color;

first signal generating means for synthesizing said plurality of color components read out from said image memory means as first image data;

second signal generating means for synthesizing said single color component image and said plurality of color component images read out from said image memory means as second image data; and

display means for displaying said first and second image data.

4,876,658

METHOD AND APPARATUS FOR SYSTEMATICALLY TESTING OBJECTS INCLUDING TENNIS BALLS

Hyman Hass, Stamford, Conn., assignor to United States Tennis Association Incorporated, New York and Allard Avionics Corp., Freeport, both of, N.Y.

Filed Aug. 19, 1986, Ser. No. 897,942
Int. Cl.[4] G06F *15/20*; A63B *37/00*; G01N *3/08*; B07C *5/00*
U.S. Cl. 364—550 **7 Claims**

7. Apparatus for conditioning, measuring and testing a tennis ball to determine if the ball meets standards of size, weight, and resilience comprising:

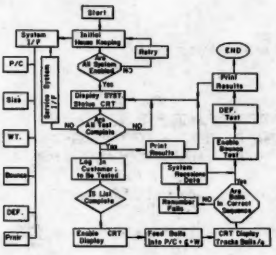
(a) a preconditioning station having in turn a plurality of

substations for flexing the ball along a variety of axes in a repeating manner;

(b) a sizing station to determined if the diameter of the ball is too large or too small;

(c) a weigh station;

(d) a bounce station in which the ball is dropped against a planar and rebounds to an elevated height and the height of the bounce is compared with selected minimum and maximum heights below and above the ball,s elevated height;



(e) a compression station in which the ball is compressed under selected forces for selected times and in which deformation the ball is measured at selected times; and

(f) indexing transport means for moving the ball in indexing fashion through the preconditioning station to and through subsequent stations in a timed systematic manner,

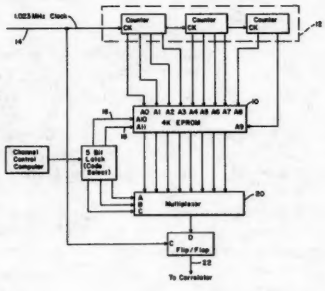
wherein the position of the tennis ball after being dropped and having rebounded is determined to measure the angle of the ball's bounce with respect to such planar surface.

4,876,659

PSEUDO-RANDOM CODE GENERATOR FOR USE WITH A GLOBAL POSITIONING SYSTEM

Devereux, William S., Glenwood, and Edwin E. Westerfield, Silver Spring, both of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed May 2, 1988, Ser. No. 188,822
Int. Cl.[4] G06F *7/00*
U.S. Cl. 364—717 **1 Claim**



1. An apparatus for generating a pseudo-random code, comprising:

a memory means for storing a set of pseudo-random codes, wherein the memory is allocated into a plurality of memory spaces each one word wide, with each bit in the word containing a bit for a different pseudo-random code, and wherein the length of the memory space is dependent on the length of the pseudo-random codes;

a first address means for selecting the memory space containing the desired pseudo-random code;

a counter operably coupled to a clock;

a second address means operably coupled to said counter to output a data word from the selected memory space of said memory with each clock cycle, where each word contains a bit associated with several possible pseudo-random codes;

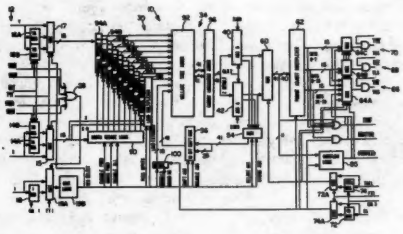
a multiplexer operably coupled to said memory to select the bit associated with the selected pseudo-random code, whereby sequential bits for the selected pseudo-random code is generated with each clock cycle.

4,876,660

FIXED-POINT MULTIPLIER-ACCUMULATOR ARCHITECTURE

Robert E. Owen, Saratoga, Calif., and Bruce E. Miller, Aloha, Oreg., assignors to Bipolar Integrated Technology, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 28,360, Mar. 20, 1987. This application Apr. 6, 1987, Ser. No. 34,829
Int. Cl.[4] G06F *7/52*
U.S. Cl. 364—754 **33 Claims**



1. In an integrated circuit, a multiplier-accumulator architecture comprising:

first data input means for inputting a binary X-ray operand comprising an array of M parallel bits wherein M is an integer greater than 2;

second data input means for inputting a binary Y-operand comprising an array of N parallel bits wherein N is an integer greater than 2;

binary multiplier means for multiplying the X-operand and the Y-operand to produce a binary product in the form of a first array of M+N parallel bits;

binary adder means for adding the binary product to a second binary array of M+N+P+1 parallel bits and outputting a Z result in the form of a third array of M+N+P+1 parallel bits, where P is a predetermined non-zero number of added bits and said 1 bit is a most significant bit;

each array being ordered from most significant to the least significant bit;

accumulator means for storing the Z result including the most significant bit as accumulator contents;

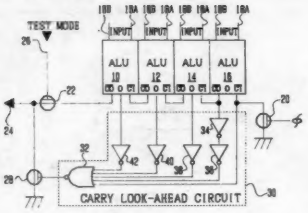
feedback means for outputting the accumulator contents to the adder means as said second binary array of M+N+P+1 bits; and

output means for outputting a selected portion of the least significant M+N+P bits of the accumulator contents.

4,876,661
ARITHMETIC LOGIC SYSTEM CAPABLE OF CHECKING CARRY LOOK-AHEAD CIRCUIT

Kei Koya, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,180
Claims priority, application Japan, Apr. 28, 1987, 62-105821
Int. Cl.[4] G06F 7/50
U.S. Cl. 364—787 7 Claims

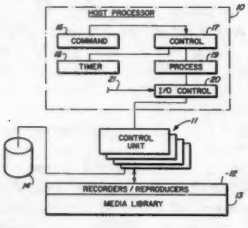


1. An arithmetic logic system which includes a plurality of arithmetic logic units, arranged in series from most significant bit (MSB) to least significant bit (LSB) positions, for processing data composed of a corresponding number of bits and having a path for transferring a carry through the respective arithmetic logic units, said system further including a carry look-ahead circuit provided in parallel to the carry transfer path and having inputs respectively connected to the arithmetic logic units for generating a carry look-ahead signal when a carry look-ahead condition is realized, said system comprising a carry signal output connected to a most significant end of said carry transfer path, a first transfer gate connected at its one end to said carry signal output and at its other end to a predetermined voltage and operating in response to said carry look-ahead signal so as to connect said carry signal output to said predetermined voltage, and a second transfer gate connected between said carry signal output and said most significant end of said carry transfer path and operating in response to a test mode signal to isolate said carry signal output from said carry transfer path, whereby when said carry signal output is isolated from said carry transfer path by said second transfer gate, a carry is transferred through only said carry look-ahead circuit to said carry signal output.

4,876,662
OPTIMIZING VOLUME MOUNTS IN A MULTIDRIVE ENVIRONMENT

Jerry W. Pence, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 2, 1988, Ser. No. 188,880
Int. Cl.[4] G06F 12/00
U.S. Cl. 364—900 7 Claims



1. In a machine-implemented method of operating a data storage system having a plurality of recorders/players for recording and reading data, each of the recorders/players for receiving and recording on and reading from record media;

the steps of:

measuring elasped time since data was received that is targeted to a record medium received in a given one of said recorders/players;

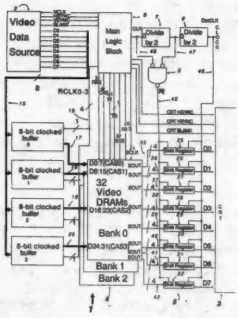
accumulating and measuring data to be transferred with respect to an unmounted record medium;

mounting an unmounted record medium in said given one recorder/player only after said accumulated and measured data reaches a first predetermined amount of said data.

4,876,663
DISPLAY INTERFACE SYSTEM USING BUFFERED VDRAMS AND PLURAL SHIFT REGISTERS FOR DATA RATE CONTROL BETWEEN DATA SOURCE AND DISPLAY

Donald G. McCord, 6304 Cat Mountain Cove, Austin, Tex. 78731

Filed Apr. 23, 1987, Ser. No. 42,111
Int. Cl.[4] G06F 3/153, 13/10, 9/44, 15/66
U.S. Cl. 364—900 6 Claims



1. For use in a video graphics system having a source of video data and a visual display device, a virtual visual display apparatus comprising:

four 8-bit buffers;

three banks of VDRAMs each of said banks having 32 VDRAMs, each of said VDRAMs having 256 rows and 256 columns of storage locations and a 256-bit internal shift register;

eight 4-bit shift registers external to said VDRAMs;

means for transferring 8 bits of data in parallel from said source of said video data to each of said buffers one at a time;

means for transferring in parallel the contents of each buffer to a storage location in eight of said VDRAMs such that the contents of said four buffers is stored in 32 VDRAMs;

means for transferring the contents of a row of said video data in each of said VDRAMs to its internal shift register;

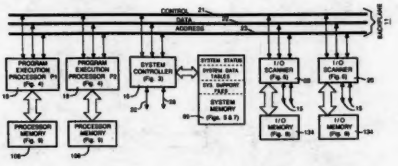
means for transferring one bit of said video data from four of said internal shift registers in parallel each of said shift registers external to said VDRAMs such that 32 bits of data from one of a bank of VDRAMs is transferred to said eight shift registers external to said VDRAMs simultaneously at said first rate; and

means for transferring bits of a video data in series from each of said eight shift registers external to said VDRAMs to said visual display device at said second rate.

4,876,664
PROGRAMMABLE CONTROLLER WITH A DUAL INTERMODULE MESSAGE SYSTEM

Bradley J. Bittorf, Shaker Heights; Mark A. Flood; Michael D. Kalan, both of Mayfield Heights, and Robert R. Sepsi, Richmond Heights, all of Ohio, assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Aug. 26, 1987, Ser. No. 89,572
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—900 11 Claims



1. A programmable controller for operating a machine to carry out a plurality of programmed functions, which includes a plurality of modules connected to a common backplane, the common backplane having a plurality of conductors for carrying data address and control signals among the modules, each module comprising:

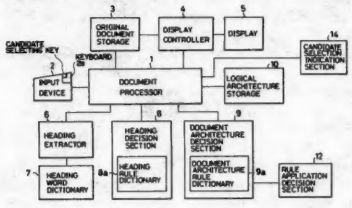
means for obtaining access to the backplane to transmit data messages to another module; and

means for storing message data from another modules, said storage means having a first set of addressable storage locations with a storage location designated for each other module.

4,876,665
DOCUMENT PROCESSING SYSTEM DECIDING APPARATUS PROVIDED WITH SELECTION FUNCTIONS

Isamu Iwai, Kawasaki; Toshio Okamoto, Bunkyo, and Miwako Doi, Kawasaki, all of Japan, assignors to Kabushiki Kaishi Toshiba, Kawasaki, Japan

Filed Dec. 29, 1986, Ser. No. 947,091
Claims priority, application Japan, Apr. 18, 1986, 61-88065
Int. Cl.[4] G06F *3/14, 15/21, 15/40, 15/62*
U.S. Cl. 364—900 3 Claims



1. A document processing apparatus comprising:

processor means for controlling document processing operations;

input means connected to said processor means, for inputting document data;

heading dictionary storing means for storing words and phrases frequently used as headings arranged in a column direction;

heading candidate extraction means connected to said processor means and said heading dictionary storing means, for extracting, as a heading candidate, one of a plurality of words and phrases, which corresponds to one of the headings stored in said heading dictionary storing means, from the document data input at said input means;

heading rule dictionary means for storing rules used in determining the headings;

heading deciding means connected to said processor means and said heading rule dictionary means, for checking whether the heading candidate extracted by said heading candidate extracting means is a heading or a non-heading according to the heading rules stored in said heading rule dictionary means;

document architecture rule dictionary means for storing rules associated with document logical architectures; and

document architecture deciding means connected to said processor means and said document architecture rule dictionary means, for deciding document logical architecture candidates of the heading by checking whether the heading and the non-heading decided by said heading deciding means is a chapter heading, a section heading or a paragraph, in accordance with the document architecture rules stored in said document architecture rule dictionary means;

the apparatus further comprising document architecture selecting and indicating means for allowing an operator to select at least one desired document architecture when said document architecture deciding means decides a plurality of document architecture candidates in accordance with document architecture rules,

wherein said document architecture selecting and indicating means comprises;

(a) rule application deciding means accessible to said document architecture rule dictionary means when plural document logical architecture candidates are decided by said document architecture deciding means, for checking a rule name requesting candidate selection to retrieve flags corresponding to the rule name from an application rule table; and

(b) candidate selecting and indicating means responsive to a candidate selecting key, provided in said document input means, for allowing the operator to update the flags by selecting at least one desired document architecture through the candidate selecting key, said document architecture rule dictionary means storing rule application record information indicative of past rule application situations and said document architecture deciding means deciding a document architecture rule to be applied with reference to the stored rule application record information in order to facilitate document architecture selection dependent upon a learning function.

4,876,666
WAVELENGTH SELECTIVE OPTICAL DATA STORAGE SYSTEM

Hitoshi Imai; Kazuo Okada, and Michihiro Tadokoro, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1987, Ser. No. 140,210
Claims priority, application Japan, Apr. 23, 1987, 62-102712
Int. Cl.[4] G11C *13/04*
U.S. Cl. 365—106 7 Claims

1. A wavelength selective optical data storage system comprising:

a light source emitting a light beam with a variable wavelength,

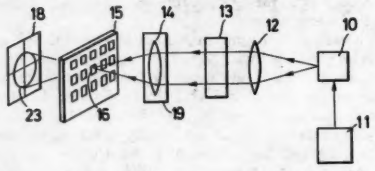
a recording medium having at least one pit-like memory element with a characteristic of wavelength selective optical data storage on which information is recorded by creating at least one recording hole by a narrow band light beam at specific wavelength position within a broad inhomogeneous absorption line, the pit-like memory element causing diffraction of the light beam transmitted through or reflected by it,

an optical means guiding the beam emitting from the source into the medium,

a position controlling means controlling a position of a beam spot on the medium so that it is positioned on the selected memory element, and

a photodetector detecting the beam transmitted through or reflected by the pit-like memory element,

wherein the photodetector is divided by a first dividing line



into two portions so that each portion detects at least part of two diffracted beams which are generated by the diffraction through the pit-like memory element, and

the position controlling means controls the position of the beam spot in accordance with an error signal produced from the difference between outputs of the two portions of the photodetector.

4,876,667

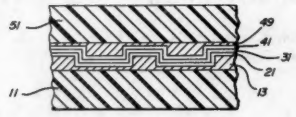
DATA STORAGE DEVICE HAVING A PHASE CHANGE MEMORY MEDIUM REVERSIBLE BY DIRECT OVERWRITE

Randall R. Ross, Murray Hill, N.J.; Eric Bjornard, Concord, Calif., and David Strand, West Bloomfield, Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Jun. 22, 1987, Ser. No. 64,645

Int. Cl.[4] G11C *13/00*; G11B *3/70*; G01D *15/10*

U.S. Cl. 365—113 **2 Claims**



1. In an optical data storage memory device comprising a substrate, a dielectric first encapsulating layer on the substrate, a memory layer on the dielectric first encapsulating layer, and a dielectric second encapsulating layer atop the memory layer, the improvement wherein the memory layer is a non-ablative, reversible, phase change memory layer comprising a solid solution of antimony, selenium, and tellurium, said solid solution being single phase in the amorphous and crystalline states, having a crystallization temperature above 120 degrees Centigrade, and having the composition

$$(Sb_2Te_3)_{1-x}(Sb_2Se_3)_x$$

where x is from 0.18 to 0.43.

4,876,668

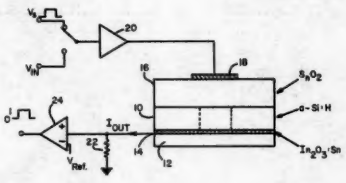
THIN FILM MEMORY MATRIX USING AMORPHOUS AND HIGH RESISTIVE LAYERS

Anilkumar P. Thakoor, Pasadena; John Lambe, Altadena, and Alexander Moopen, Pasadena, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 761,185, Jul. 31, 1985, abandoned. This application Apr. 29, 1986, Ser. No. 857,076

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—163 **12 Claims**



1. A matrix of nonvolatile memory cells for storing bits of data comprised of

a thin film of amorphous semiconductor material overlayed by a thin film of resistive material,

a plurality of parallel ohmic contact strips on the surface of said resistive material opposite said amorphous semiconductor material,

a plurality of parallel ohmic contact strips on the surface of said semiconductor material opposite said resistive material and perpendicular to said contact strips on said thin film of resistive material, and

means for applying a pulse of electrical energy through said thin film of amorphous semiconductor material and said overyling resistive material through said contacts, said pulse being sufficient voltage to switch said amorphous semiconductor material from a high state to a low state of resistance, and for thereafter applying a pulse of electrical current sufficient to sense the state of said semiconductor material.

4,876,669

MOS STATIC TYPE RAM HAVING A VARIABLE LOAD

Sho Yamamoto, Kodaira; Osamu Minato, Hinode; Makoto Saeki, Kodaira; Yasuo Yoshitomi, Fucyu; Hideaki Nakamura, Kodaira, and Masaaki Kubotera, Koganei, all of Japan, assignors to Hitachi Microcomputer Hitachi, Ltd. & Engineering, Ltd., Tokyo, Japan

Continuation of Ser. No. 740,550, Jun. 3, 1985, Pat. No. 4,760,561. This application Jun. 7, 1988, Ser. No. 203,459

Claims priority, application Japan, Jun. 4, 1984, 59-113001

Int. Cl.[4] G11C *7/00, 11/40*

U.S. Cl. 365—189.01 **34 Claims**

1. An MOS static RAM comprising:

a plurality of static memory cells;

a pair of complementary data lines to which data input-output terminals of the static memory cells are connected;

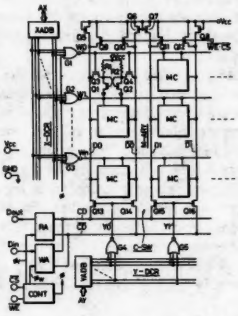
a plurality of word lines to which the selection terminals of said static memory cells are connected, respectively;

variable load means coupled between a power supply terminal of the static RAM and the complementary data lines, respectively, the variable load means being constructed to be controlled such that their impedance becomes higher in a data write-in operation than the impedance thereof in a data read-out operation;

selection means for selecting one of said plurality of word lines; and

control means for controlling the state of the selected word line in the read-out operation so that the selected state of the word line is held during a period from the start of the selection of the word line to the time when there is a

predetermined difference in the level difference between the pair of complementary data lines to be changed in accordance with the data stored in a static memory cell to



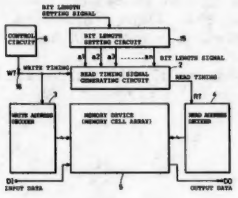
which the selected word line is coupled, the selected word line being brought into an unselected state after the period.

4,876,670

VARIABLE DELAY CIRCUIT FOR DELAYING INPUT DATA

Takeo Nakabayashi, and Masao Nakaya, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1987, Ser. No. 130,741
Claims priority, application Japan, Dec. 10, 1986, 61-293712
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—194 **6 Claims**



1. A variable delay circuit for delaying input data, comprising:

a memory device (5) formed by a two-dimensional array of memory cells for storing the input data;

write address decoder means (3) for accessing selectively memory cells of said memory device (5) and writing said input data into the cells accessed by said write address decoder means (3);

read address decoder means (4) for accessing said memory cells of said memory device (5) and reading said input data from the cells accessed by said read address decoder means (4);

programmable timing signal generating means (2) synchronized to an operation of said write addresses decoder means (3) for controlling an operation of said read address decoder means (2) following a programmable delay time; and

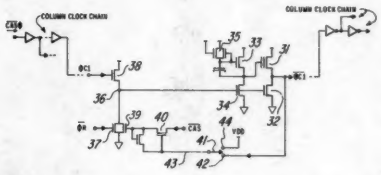
means (15) for setting the programmable delay time of said timing signal generating means (2) to a desired delay time.

4,876,671

SEMICONDUCTOR DYNAMIC MEMORY DEVICE WITH METAL-LEVEL SELECTION OF PAGE MODE OR NIBBLE MODE

Roger D. Norwood, Sugar Land; Jino Chun, Houston, and Pravin P. Patel, Sugar Land, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 232,543, Aug. 11, 1988, abandoned, which is a continuation of Ser. No. 122,508, Nov. 17, 1987, abandoned, which is a continuation of Ser. No. 728,740, Apr. 30, 1985, abandoned. This application Apr. 6, 1989, Ser. No. 336,637
Int. Cl.[4] G11C *8/00, 7/00*
U.S. Cl. 365—233 **29 Claims**



1. A semiconductor dynamic read/write memory device manufactured to provide either page mode or nibble mode of operation, but not both, comprising:

a memory array with rows and columns of cells,

row addressing means for selecting a row of cells in response to a row address and a row address strobe signal,

column addressing means for selecting a plurality of columns of cells in response to a column address and a column address strobe signal,

data input/output means coupled to said column addressing means to input or output data selected among said plurality of columns,

and selector means for selecting between page mode of operation and nibble mode of operation, said selector means including clock circuitry for coupling said column address strobe signal to said data input/output means,

said selector means rendering a clock to be either responsive or non-responsive to toggling of said column address strobe signal,

wherein said clock is rendered either responsive or non-responsive by a single conductor-level connection in manufacture.

4,876,672

ULTRASONIC LOGGING TOOL WITH ROTATING EXPOSED TRANSDUCER

Steven G. Petermann, Plano, and Thomas Schasteen, Garland, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 1, 1988, Ser. No. 162,771
Int. Cl.[4] R21B *47/00*; G01V *1/40*
U.S. Cl. 367—35 **9 Claims**

1. An ultrasonic logging tool for use in a borehole of a well filled with borehole fluid, and tool comprising:

a housing;

a drive means mounted in said housing;

a hollow drive shaft coupled to and adapted to be rotated by said drive means, said drive shaft extending out of said housing;

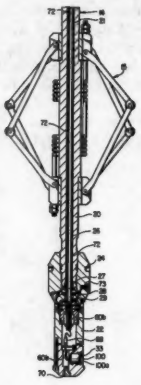
a rotor attached to said drive shaft outside said housing for rotation with said shaft;

a transducer means having a surface for emitting ultrasonic pulses and receiving echoes from said pulses, said transducer means being mounted on said rotor for rotating therewith and with said one surface being directly exposed to the borehole fluid when said tool is in an operable position within said borehole;

seal means mounted in said housing and surrounding said

drive shaft for sealing between said shaft and said housing; and

pressure compensating means in said housing for providing a pressure in said housing at the interior of said sealing means equal to or greater than the pressure in the borehole fluid applied against the exterior of said seal means when said tool is in an operable position in said borehole.

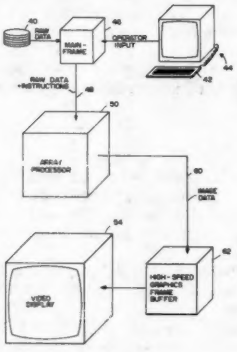


4,876,673

DISPLAY OF COMMON DEPTH POINT SEISMIC DATA WITH VELOCITY CORRECTION IN REAL TIME

Douglas W. McCowan, Colleyville, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 19, 1988, Ser. No. 145,015
Int. Cl.[4] G01V *1/28*
U.S. Cl. 367—68 **9 Claims**



8. A method of generating a depiction of the subterranean structure of the earth, comprising the steps of:

performing seismic exploration operations at a location on the surface of the earth, in which seismic energy is transmitted downwardly into the earth at a first shotpoint location, and is reflected upwardly at interfaces between rock layers in the earth, and detecting and recording the reflected energy employing transducers located at a number of recording locations on the surface of the earth spaced from the shotpoint;

accepting operator commands indicative of initial assumptions concerning the velocity of seismic energy in the subterranean structure, and the shape and thickness of the various layers of rock in the subterranean structure;

performing normal movement correction on each of the signals recorded by each of the transducers at the recording locations, thereby making correction for travel time variations between the shotpoint and recording locations close to the shotpoint and locations further from the shotpoint;

displaying the corrected signals as traces corresponding to the signals recorded by each of the transducers, wherein the traces are ordered according to the relative positions of the corresponding transducers with respect to the shotpoint, and the display is of the amplitude of the corrected signals versus time of receipt of the signal;

accepting further operator commands regarding updated assumptions with respect to the velocity of seismic energy and the shape and thickness of the layers of rock in the subterranean structure; and

repeating said performing and displaying steps essentially instantaneously in response to accepted further operator commands;

wherein said performing, displaying and accepting steps are performed on a computer system comprising:

a display device for displaying the corrected traces;

an array processor for performing said normal movement correction step, connected to said display device for supplying the corrected signals directly thereto for display; and

a mainframe computer, comprising means for accepting said operator commands and for supplying the to said array processor means;

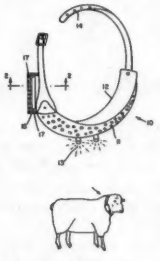
wherein the mainframe computer does not in any way control the display of the corrected traces on the display deice after performance of the normal movement correction step by the array processor, so that said display of said corrected traces is updated responsive to new operator commands substantially in real time.

4,876,674

SONIC COLLAR SHEEP PROTECTOR

Kevin W. Parmely, HRC 89, Box 193, Hamill, S. Dak. 57534; Scot R. Van Asten, 1021A Wisconsin St., Oshkosh, Wis. 54901, and Harbor E. Stanton, P.O. Box 232, Ferryville, Wis. 54628

Filed Aug. 15, 1988, Ser. No. 232,226
Int. Cl.[4] H04B *1/02*
U.S. Cl. 367—139 **6 Claims**



1. A motion-sensing predator control sonic collar alarm unit adapted to be placed around the neck of livestock for repelling attacking predators, comprising:

means for detecting startled or sudden bodily motion of said livestock in excess of a preselected threshold;

means for transforming said bodily motion into an electrical impulse; and

means for converting said electrical impulse into an audio

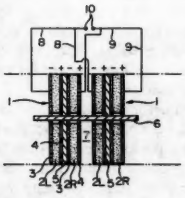
alarm sound which is detectable by and repulsive to a predator and for a period of time sufficient to repel an attack.

4,876,675

TOWED PIEZOELECTRIC CABLE

Kohji Ogura, Ohgaki, and Kasumi Ogawa, Kagamihara, both of Japan, assignors to NGK Spark Plug Co., Ltd., Japan

Filed Sep. 7, 1988, Ser. No. 241,308
Claims priority, application Japan, Sep. 12, 1987, 62-228941; Nov. 9, 1987, 62-283816; Nov. 12, 1987, 62-287008
Int. Cl.[4] G01V *1/38*
U.S. Cl. 367—155 22 Claims



1. A towed piezoelectric cable comprising a plurality of receiver units, each of said receiver units comprising piezoelectric element layers having a thickness which are polarized in the direction of the thickness of the layers and arranged so that the piezoelectric element layers have the same polarizing direction and a conductive connecting member having a pair of surfaces on which respective ones of said piezoelectric element layers are provided, each said piezoelectric element layer being provided with an inner electrode and an outer electrode, and the inner electrodes of each of said piezoelectric element layers in each said piezoelectric receiver unit being electrically connected together by and thus shortcircuited through said connecting member; a nonshrinking flexible core disposed to pass through the center of said each receiver unit for supporting said receiver units while leaving a buffer zone between adjacent receiver units; means connected to each said receiver unit for producing a potential induced between the outer electrodes of said piezoelectric element layers; and a flexible tube containing the assembly of said receiver units and said flexible core, said flexible tube being filled with an insulating oil.

4,876,676

VOICE RECOGNIZING ALARM TIMEPIECE

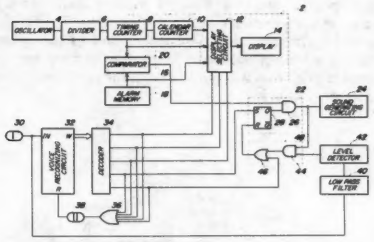
Hiroshi Shimizu, and Yoshito Yamaguchi, both of 496, Ohbusuma, Showa-machi, Kitakatsushika-gun, Saitama, Japan

Filed Feb. 15, 1989, Ser. No. 311,106
Claims priority, application Japan, Feb. 29, 1988, 63-27444[U]
Int. Cl.[4] G04B *21/08, 23/00*
U.S. Cl. 368—63 2 Claims

1. In a voice recognizing alarm timepiece including a timing circuit which counts the current time, an alarm circuit which outputs a coincident signal when the current time counted by said timing circuit coincides with a predetermined time, a sound generating circuit which generates a sound by receiving said coincident signal, an alarm control circuit which controls whether to supply said coincident signal to said sound generating circuit or not, a microphone which detects an external voice, a voice recognizing circuit which outputs a recognizing signal by recognizing whether said external voice detected by said microphone corresponds to one of the stored voices or not, a decoder which supplies to said alarm control circuit the alarm turn on signal allowing said coincident signal to be supplied to said sound generating circuit and the alarm turn off signal preventing said coincident signal from being supplied to said sound generating circuit, upon receipt of said recognizing signal, and said timepiece includes:

a low-pass filter which eliminates high frequency components in said voice signal from said microphone;

a level detector which outputs a detected signal whenever the volume level of said voice signal through said low-pass filter is higher than predetermined level; and



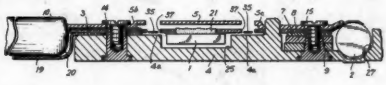
a gating circuit which receives said detected signal from said level detector and supplies said alarm turn off signal to said alarm control circuit when said coincident signal from said alarm control circuit is supplied to said sound generating circuit.

4,876,677

SENSOR MOUNT FOR AN ELECTRONIC TIMEPIECE

Tatsuo Moriya, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed Mar. 4, 1988, Ser. No. 164,352
Claims priority, application Japan, Mar. 5, 1987, 62-32208[U]; Mar. 5, 1987, 62-32209; Mar. 6, 1987, 62-32785[U]
Int. Cl.[4] G01C *19/00*; G04B *37/00*
U.S. Cl. 368—87 11 Claims



1. In an electronic timepiece including a base plate, an IC chip having a built-in semiconductor sensor for measuring the surrounding state, a circuit substrate having the IC chip mounted thereon, the improvement which comprises:

fixing means for fixing the circuit substrate to the base plate at at least two fixing positions spaced sufficiently far from the mounting position of the IC chip so that the circuit substrate in the region around the IC chip does contact any other element of the time timepiece, the fixing means including a circuit supporting plate for securing the circuit substate to the base plate only at the fixing positions.

4,876,678

SOUND REPRODUCING DEVICE FOR PLAYING A RECORD DISC HAVING A PLURALITY OF RECORDED GROOVES

Koike, Eishi, Sagamihara, and Yasuhiko Yusa, Machida, both of Japan, assignors to Ozen Corporation, Machida, Japan

Filed Mar. 23, 1989, Ser. No. 327,762
Claims priority, application Japan, Mar. 23, 1988, 63-68702
Int. Cl.[4] G11B *17/06, 3/60*
U.S. Cl. 369—31 4 Claims

1. A simplified sound reproducing device for playing a record disc having a plurality of recorded grooves comprising:

(a) a casing;

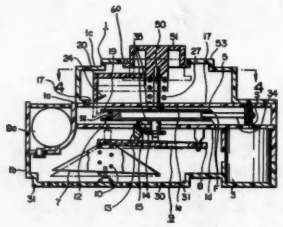
(b) a record disc unit disposed in the casing and having a

plurality of recorded grooves which define a recorded face thereof, the record disc unit having a circular periphery with an index tracking portion formed thereon, the casing having a plurality of index setting openings formed therein along the periphery of the record disc, the number of index setting openings corresponding to the number of recorded grooves;

(c) a center pin disposed in the casing, the disc unit being rotatably supported on the center pin,

(d) a speaker unit comprising a speaker cone and a sound transmitting member attached thereto,

(e) means for mounting the speaker unit to the casing, the mounting means allowing for swingable movement of the speaker unit toward or away from the recorded face of the record disc unit;



(f) a stylus force spring disposed in the casing for urging the sound transmitting member toward the recorded face of said record disc unit,

(g) a pickup interposed said sound transmitting member and said record disc unit;

(h) means for urging the pickup radially outwardly with respect to the recorded face,

(i) means for rotating the disc unit,

(j) a rotatable index setting knob disposed at an upper end of the center pin,

(k) an index setting arm supported by said index setting knob, the index setting arm having an engaging hook thereon for insertion into the index setting openings; and

(l) a fixed indexing ring disposed outside the casing and bearing indicia thereon for showing items recorded in the grooves of said record disc unit.

4,876,679

DIGITALLY CONTROLLED POSITIONING SYSTEM FOR QUICKLY MOVING AND THEN FINELY POSITIONING AN OBJECT

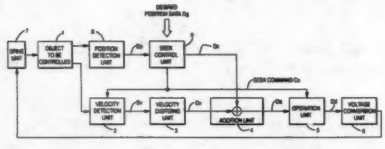
Toshiharu Mukai, Sennan, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 4, 1988, Ser. No. 152,428

Claims priority, application Japan, Feb. 4, 1987, 62-24065; Feb. 4, 1987, 62-24070

Int. Cl.[4] G11B 7/00

U.S. Cl. 369—44 **5 Claims**



1. A positioning system for controlling an object which is to be moved quickly in a first, high speed moving, mode and which is to be positioned finely at a desired position in a second, high positional resolution moving, mode, said system comprising:

a position detecting means for detecting an actual position of said object, and for producing absolute position data indicative of said actual position;

a seek control means for comparing said actual position data with predetermined desired position data and for producing position compensation data representing a difference between said actual position data and said desired position data, said seek control means also outputting a seek command signal when said position compensation data is larger than a predetermined value;

a velocity sense means for detecting a moving velocity of the object to be moved and for providing an output corresponds thereto, said sense means decreasing its gain in response to said seek command signal from said seek control means;

a velocity digitizing means for digitizing said output of said velocity sense means so as to output digital velocity data;

an addition means for adding said velocity data from said velocity digitizing to said position compensation data from said seek control means and for providing an output corresponding thereto;

an operation means for processing said output of said addition means to be obtain position control data, and for multiplying said position control data by a predetermined coefficient to produce output data corresponding thereto, said predetermined coefficient being increased in response to said seek command signal from said seek control means;

a voltage conversion means for converting said output data from said operation means into a voltage signal; and

a drive means for moving said object to be controlled according to said voltage signal.

4,876,680

MONOLITHIC OPTICAL PICK-UP USING AN OPTICAL WAVEGUIDE

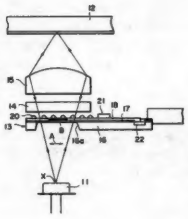
Shigeyoshi Misawa, Tokyo, and Hiroyoshi Funato, Chigasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 4, 1987, Ser. No. 93,368

Claims priority, application Japan, Sep. 5, 1986, 61-209811; Sep. 16, 1986, 61-217785; Mar. 20, 1987, 62-66834

Int. Cl.[4] G11B 7/12, 7/135

U.S. Cl. 369—110 **26 Claims**



1. An optical pick-up device for optically reading and/or recording information from and/or to a recording medium, comprising:

an opaque substrate formed with an opening through which light may pass;

an optical waveguide formed on said substrate, said optical waveguide also extending across said opening;

a first diffraction grating formed on said optical waveguide located in registry with said opening;

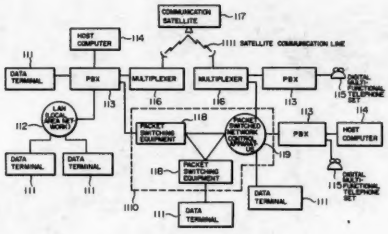
detecting means provided integrally with said substrate for detecting diffracted light from said first diffraction grating; and

focusing means for focusing light passing through said opening of said substrate onto said recording medium.

4,876,681
PACKET SWITCHING EQUIPMENT AND A PACKET SWITCHING METHOD FOR CONTROLLING PACKET SWITCHED NETWORKS

Masayoshi Hagiwara, Kawasaki; Michio Suzuki, Yokohama; Ryoichi Sasaki, Fujisawa; Minoru Sugano; Akira Horiki, both of Yokohama, and Kazuyuki Hayashi, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 13, 1988, Ser. No. 194,044
Claims priority, application Japan, May 15, 1987, 62-116805; Jun. 8, 1987, 62-141463
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—60 6 Claims



1. A packet switching equipment connected to a plurality of terminals or other packet switching equipment by plurality of first transmission line means, each of said plurality of first transmission line means having a pair of an input line and an output line, wherein a packet received from the input line of one first transmission line means is sent out to the output line of another first transmission line means in accordance with a destination address contained in the packet, said packet switching equipment comprising:

a plurality of switch units connected in a hierarchy configuration having a least first and second levels, said first level including a plurality of first switch units each connected to a group of said first transmission line means, said second level including a single second switch unit connected to said plurality of first switch units respectively by a plurality of second transmission line means, each of said plurality of second transmission line means having a second pair of an input line and an output line, wherein,

each of said plurality of first switch units includes:

anterior judging means having a plurality of bit switches coupled so as to selectively output the packet to the output line of one of said second transmission line means or a third signal line in accordance with a content of a first part of an address in the packet received from each input line of said group of said first transmission line means, and

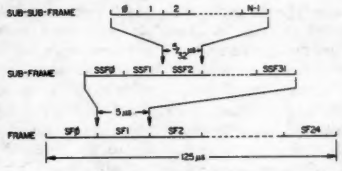
posterior judging means having a plurality of bit switches coupled so as to selectively output the packet to any output line of said group of said first transmission line means in accordance with a content of a second part of the address in the packet received from said third signal line or the output of said second transmission line means,

wherein, said single second switch unit includes a plurality of bit switches coupled so as to selectively output the packet received from the input line of each said second transmission line means to the output line of any another one of said second transmission line means in accordance with the content of the first part of the address of the packet.

4,876,682
SWITCHING TDM DIGITAL SIGNALS

Alan F. Graves, Sherwood Park; Paul A. Littlewood, and Johannes S. Weiss, both of Edmonton, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed May 13, 1986, Ser. No. 862,730
Claims priority, application Canada, Apr. 1, 1986, 505501
Int. Cl.[4] H04J *3/22*
U.S. Cl. 370—66 16 Claims

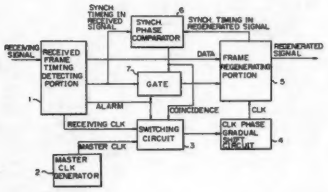


1. A method of switching digital signals multiplexed in tdm (time division multiplex) frames having harmonically related frame and sub-frame periods, comprising the steps of cyclically operating a first time switch with a frame period corresponding to one of said harmonically related periods thereby to switch time channels of said digital signals to provide switched signals having a first bandwidth; cyclically operating a second time switch with a frame period corresponding to another of said harmonically related periods thereby to switch time channels of said digital signals to provide switched signals having a second bandwidth harmonically related to the first bandwidth; and conducting digital signals to, from, and between the switches.

4,876,683
REPEATER FOR REGENERATING FRAME-MULTIPLEXED SIGNAL

Eiji Suzuki, Tochigi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 15, 1989, Ser. No. 323,942
Claims priority, application Japan, Mar. 16, 1988, 63-060219
Int. Cl.[4] H04J *3/06*
U.S. Cl. 370—97 3 Claims



1. A repeater comprising:

a received frame timing detecting portion which extracts a receiving clock from a received frame-multiplexed signal, detects a timing of frame synchronization in said received signal, and outputs an alarm signal which indicates whether or not said timing of frame synchronization is successfully detected;

a master clock generator which generates a master clock;

a frame synchronization phase comparator which detects a coincidence between said timing of frame synchronization detected in said received signal and a timing of frame synchronization in a regenerated frame-multiplexed signal;

a switching circuit the output of which is said receiving clock except: said output is switched to said master clock

when said alarm signal indicates a failure of said detection, and said output is switched back to said receiving clock when said alarm signal indicates a successful detection and said coincidence is simultaneously detected;

a clock phase gradual shift circuit which receives the output of said switching circuit as an input clock, outputs an output clock synchronized with said input clock except that a phase shift resulting from an abrupt phase shift occurring in the input clock, gradually appears in an output clock after the abrupt phase shift in the input clock;

a frame regenerating portion which receives the output of said clock phase gradual shift circuit as a clock, determines said timing of frame synchronization in a regenerated frame-multiplexed signal, and regenerates said frame-multiplexed signal corresponding to said received signal, wherein said timing of frame synchronization in said regenerated frame-multiplexed signal is synchronized with said timing of frame synchronization detected in said received signal when said timing of frame synchronization is supplied, and said timing of frame synchronization in said regenerated frame-multiplexed signal is generated from said output of said clock phase gradual shift circuit when said timing of frame synchronization is not supplied; and

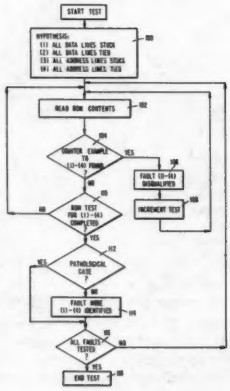
a gate which receives said timing of frame synchronization detected in said received signal and supplies said timing of frame synchronization only when said alarm signal indicates a successful detection and said coincidence is simultaneously detected.

4,876,684

METHOD OF AND APPARATUS FOR DIAGNOSING FAILURES IN READ ONLY MEMORY SYSTEMS AND THE LIKE

Kurt Guntheroth, Mukilteo, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Feb. 11, 1988, Ser. No. 154,927
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—21.2 **15 Claims**



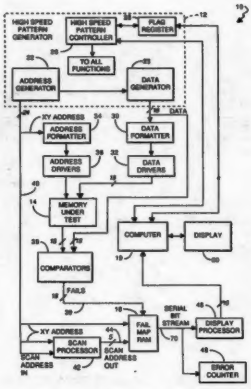
1. A method of testing and diagnosing faults in a memory having data prestored therein, comprising the steps of assuming initially that said memory is defective; addressing different storage locations within said memory; detecting any relationships between data stored in different memory locations which disproves said assumption; and based on said relationships, identifying particular faults.

4,876,685

FAILURE INFORMATION PROCESSING IN AUTOMATIC MEMORY TESTER

Marc A. Rich, Chatsworth, Calif., assignor to Teradyne, Inc., Boston, Mass.

Filed Jun. 8, 1987, Ser. No. 59,550
Int. Cl.[4] G01R *31/28*; G06F *11/00*
U.S. Cl. 371—21.6 **10 Claims**



1. Automatic memory tester apparatus for processing failure information of a memory under test (MUT) having plural memory elements and associated MUT addresses, said apparatus comprising

a high speed pattern generator for providing digital test patterns to said MUT for storage of data at said MUT addresses in said MUT,

a failure processor for comparing outputs from said MUT with expected outputs to obtain failure information,

a fail map random access memory (RAM) having fail map addresses corresponding to said MUT addresses and connected to receive said failure information and store it at corresponding said fail map addresses, said fail map addresses including bits to address individual bits of multibit words,

address circuitry means for randomly addressing and reading individual bits of said multibit words to provide a serial bit output in which individual bits are in a different sequence than the sequence in which they are stored in said fail map RAM,

said different sequence relating to relative topical positions of said memory elements corresponding to individual bits of said serial bit sequences,

said address circuitry means including an address generator of said high-speed pattern generator connected to address said fail map RAM, and

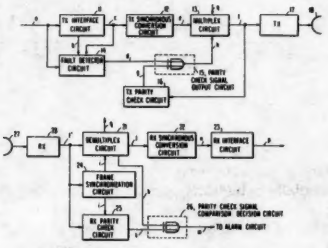
means for receiving said serial bit output and visually displaying failure information in a two-dimensional display in which relative positions of display of said individual bits relate to topical positions of associated memory elements on said MUT.

4,876,686

FAULT DETECTION SIGNAL TRANSMISSION SYSTEM

Katsuhiro Sasaki, and Seiji Fukuda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Oct. 20, 1987, Ser. No. 110,316
Claims priority, application Japan, Oct. 20, 1986, 61-248983
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—49.1 13 Claims



13. A fault detecting signal transmission system having a transmit terminal, said transmit terminal comprising:

a transmit interface circuit for processing an input signal from a pre-stage circuit of said transmit interface circuit to produce an output signal that a post-stage circuit can process;

a fault detector circuit for generating a fault detecting signal by detecting an apparatus fault of said transmit interface circuit;

a multiplex conversion circuit, forming said pre-stage circuit, for producing a multiplex signal by multiplexing at least a parity check signal with an output signal of said transmit interface circuit to produce a multiplexed signal;

a transmit parity check circuit for checking parity of said multiplexed signal; and

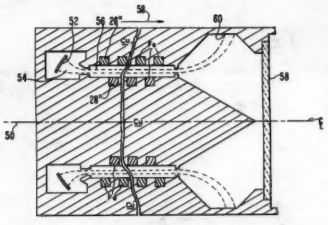
a parity check signal output circuit responsive to said fault detection signal and an output signal of said transmit parity check circuit for producing said parity check signal by inverting a logical state of the output signal of said transmit parity check circuit, when said fault detection signal is representative of a fault.

4,876,687

SHORT-PERIOD ELECTRON BEAM WIGGLER

Joseph Feinstein, Menlo Park, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 47,078, May 5, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 310,477
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—2 35 Claims



1. A magnetic wiggler for a linear electron beam comprising:

a passageway for said beam, a first set of ferromagnetic polepieces periodically spaced in the direction of flow of said beam, separated by nonmagnetic spaces, and positioned on a first side of said passageway;

a second set of ferromagnetic polepieces on the opposing side of said passageway, periodically spaced to alternate in said direction of beam flow with polepieces of said first set; and

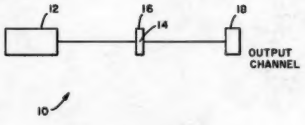
means for generating a relatively uniform magnetomotive force in said direction of beam flow, to generate a component of magnetic field transverse to said passageway alternating between polepieces of said two sets.

4,876,688

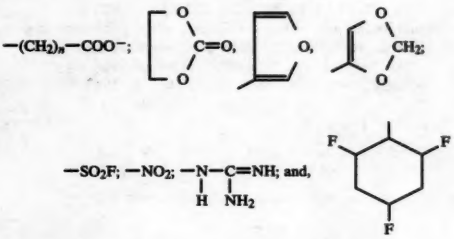
FREQUENCY DOUBLING CRYSTALS

Francis Wang, Danville, and Stephan P. Velsko, Livermore, both of Calif., assignors to The United States of America as represented by the Secetary of the Department of Energy, Washington, D.C.

Filed Aug. 15, 1988, Ser. No. 232,200
Int. Cl.[4] H01S *3/10*
U.S. Cl. 372—22 20 Claims



6. A frequency doubling crystal comprising an organic compound including in combination a chiral carbon (C^*) atom and a harmonic generating member selected from the group consisting of



said harmonic generating member chemically bonded to said chiral carbon (C^*) atom, said frequency doubling crystal exclusive of L-arginine phosphate, diammonium tartrate, L-threonine, D-threonine, L-glutamic acid hydrochloride, and dipotassium tartrate hemihydrate.

4,876,689

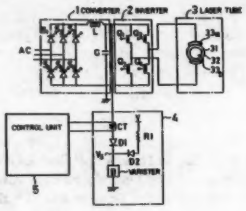
OUTPUT VOLTAGE DETECTING DEVICE IN A LASER OSCILLATOR

Akira Egawa, Minamitsura, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00183, § 371 Date Oct. 27, 1988, § 102(e) Date Oct. 27, 1988, PCT Pub. No. WO88/06810, PCT Pub. Date Sep. 7, 1988
PCT Filed Feb. 19, 1988, Ser. No. 269,743
Claims priority, application Japan, Mar. 3, 1987, 62-48410; Mar. 3, 1987, 62-48411; Mar. 3, 1987, 62-48412
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—38 15 Claims

1. An output voltage detecting device in a laser oscillator, a high frequency power voltage being supplied to a laser tube to perform laser oscillation, said output voltage detecting device comprising:

an inverter for supplying the high frequency power voltage;
a voltage detection circuit connected to an input of said inverter, said voltage detector circuit comprising:
a non-linear element in which a reference voltage is set;



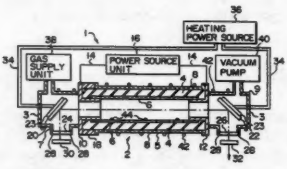
a current transformer, connected to said non-linear element, for detecting a current flowing in said non-linear element, an abnormality of the output voltage being detected from the current flowing in said non-linear element.

4,876,690

METAL VAPOR LASER APPARATUS

Naoto Nishida, and Mitsuhiro Nishio, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 20, 1988, Ser. No. 286,864
Claims priority, application Japan, Dec. 24, 1987, 62-325362
Int. Cl.[4] H01S 3/22, 3/04
U.S. Cl. 372—56 9 Claims



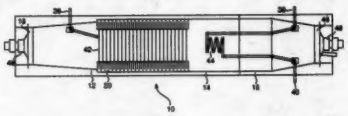
1. A metal vapor laser apparatus comprising:
a discharge tube for generating a laser beam, said tube containing a buffer gas under a predetermined pressure and having at least one set of discharge electrodes;
power source means for applying a voltage to said electrodes;
a metal vapor source arranged in said tube;
two high reflecting mirrors for reflecting the laser beam in the direction crossing its optical axis, said high reflecting mirrors being arranged at both side end portions of said discharge tube to oppose each other;
heating means for heating said two high reflecting mirrors;
transmission windows for transmitting a laser beam reflected by said high reflecting mirrors, said windows being arranged in said discharge tube; and
a pair of resonator mirrors for emitting a laser beam which transits said transmission windows, said resonator mirrors being arranged outside of said tube.

4,876,691

ION LASER

Joseph F. Rando, Los Altos Hills, and Eric W. Blumer, Sunnyvale, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Division of Ser. No. 913,163, Sep. 29, 1986. This application Sep. 16, 1988, Ser. No. 245,109
Int. Cl.[4] H01S 3/03
U.S. Cl. 372—65 9 Claims



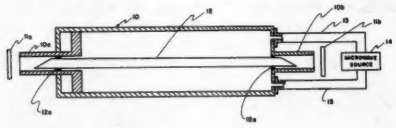
1. An ion laser, comprising:
a substantially cylindrical ceramic tube including an interior step,
a plurality of thin metal disc each having a central aperture defining a plasma discharge region extending substantially along a longitudinal axis of said tube, and a plurality of apertures disposed substantially at the periphery of each disc to allow for equalization of pressure within the interior of said tube;
an annulus of ceramic formed around the periphery of each individual disc forming a metal disk member said disc being stacked in the interior of said tube and being supported by said step, said annulus cf ceramic supporting each of said disc members in said ceramic tube and said ceramic annulus and providing heat transport from said thin metal disc to said ceramic tube to provide cooling of said plasma discharge region;
a cathode disposed in the interior of said ceramic tube;
an anode disposed in the interior of said ceramic tube;
means for hermetically sealing each opposing end of said tube; and
mirror means disposed at each opposing end of said tube.

4,876,692

MICROWAVE-PUMPED ATOMIC GAS LASER

Jenny Bramley, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 26, 1982, Ser. No. 362,419
Int. Cl.[4] H01S 3/09
U.S. Cl. 372—70 3 Claims



1. A method of obtaining coherent optical or quasi-optical radiation from a chemical element whose first excited state is metastable, including the steps of:
enclosing a solid compound containing said element in a gas-tight enclosure containing a buffer gas or mixture of gases;
placing said enclosure in a microwave cavity and between laser mirrors; and
pumping said compound with microwave radiation to dissociate the said element from the compound, whereby said element goes to its first excited state and whereby the optical or quasi-optical radiation is emitted by said element as it falls to its ground state and recombines with at least one element of said compound to form a compound

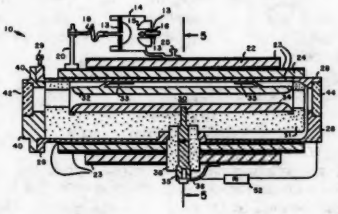
which may be excited by the microwaves to again dissociate and to repeat the process.

4,876,693

INTEGRATED LASER HEAD AND LOW INDUCTANCE PULSE FORMING CIRCUIT FOR PULSED GAS LASERS

David J. Lacero, Upland; Claudio G. Parazzoli, Pacific Palisades, and Metin S. Mangir, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 26, 1984, Ser. No. 686,339
Int. Cl.[4] H01S *3/09*
U.S. Cl. 372—82 23 Claims



10. Integrated self-sustained discharge laser head apparatus for pulsed gas lasers comprising:

(a) pulse initiation means;

(b) energy storage means which provides for minimal inductance between said energy storage means and a plurality of transverse discharge electrodes, and in which said discharge electrodes are located within;

(c) LC inverter means for delivering energy from said energy storage means to said discharge electrode means;

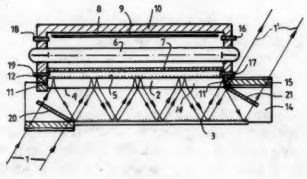
(d) laser resonator means including a pressure vessel which further includes a chamber containing a gas laser medium for producing high power laser pulses said apparatus being adapted to operate at internal gas pressures substantially above one atmosphere.

4,876,694

EXTERNAL CAVITY SLAB LASERS

John L. Hughes, Torrens, Australia, assignor to Advanced Lasers Limited, Canberra City, Australia

Continuation of Ser. No. 882,678, Jul. 7, 1986, abandoned. This application Dec. 23, 1988, Ser. No. 289,500
Int. Cl.[4] H01S *3/081*
U.S. Cl. 372—93 9 Claims



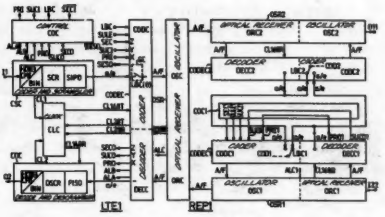
1. An external cavity, single slab laser system comprising three sections, namely, a slab laser medium for amplifying a laser beam, a source of optical radiation which excites said slab, said slab laser medium being cut into the shape of a rectangular block whose length is greater than its width and whose thickness is less than the diameter of the laser beam to be amplified, two large faces defined by the length and width of said block being optically polished, one of the said faces being coated with the dielectric laser mirror while the other face is anti-reflection coated at the laser wavelength, said block laser medium being optically excited through the said laser mirror using the filtered optical output of water cooled lamps, the laser beam undergoing amplification being directed into the said block laser medium via the said anti-reflection coated face to be reflected off the said laser mirror out of said laser medium block via the anti-reflection coated face to be reflected off a second laser mirror, separated from, and positioned parallel to, the said anti-reflecting coated surface, back into the said laser block medium where the said laser beam is amplified during each passage through said block laser medium, the said second laser mirror being spaced from said anti-reflection coated face of said block so that said laser beam reflection off said second laser mirror is directed back into said block.

4,876,695

DIGITAL DATA TRANSMISSION SYSTEM HAVING ADDITIONAL BITS FOR AUXILIARY DATA

Hugo F. J. Witters, Berlaar, and Joannes C. A. M. Wouters, Schoten, both of Belgium, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jun. 12, 1987, Ser. No. 62,145
Claims priority, application Belgium, Jun. 13, 1986, 2/60994
Int. Cl.[4] H04B *3/36;* H04L *25/20*
U.S. Cl. 375—3 20 Claims



1. In a digital data transmission system having a sending station able to convert serial p-bit words into serial q-bit words, with q larger than p, and a receiving station able to convert received serial q-bit words back into serial p-bit words, an improved repeater station for repeating transmissions from said sending station to said receiving station, said repeater station comprising:

a sender unit comprising means for converting at least one predetermined p-bit word together with a auxiliary signal into a predetermined q-bit word and

a receiver unit having a q-bit output connected in parallel to p-bit input of said sender unit, said receiver unit comprising

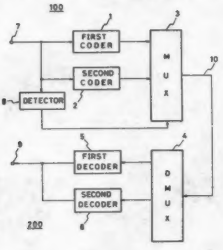
means for converting a predetermined q-bit word back into a predetermined p-bit word and a auxiliary signal, and

a user and source circuit responsive to a received auxiliary signal derived from the auxiliary signal provided by said receiver unit and including gating means controlled by a control signal provided by said user and source circuit for supplying to said sender unit either said received auxiliary signal or an alternative auxiliary signal provided by said user and source circuit.

4,876,696
TRANSMISSION SYSTEM FOR TRANSMITTING MULTIFREQUENCY SIGNALS OR MODEM SIGNALS WITH SPEECH SIGNALS

Toshio Yoshikawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 20, 1987, Ser. No. 75,455
Claims priority, application Japan, Jul. 18, 1986, 61-167793; Sep. 30, 1986, 61-230132
Int. Cl.[4] H04J *3/16*
U.S. Cl. 375—5 **1 Claim**



1. A transmission system comprising:

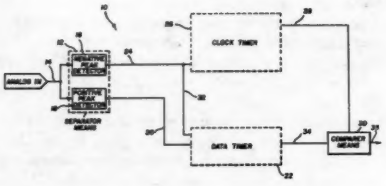
transmitting means comprising a common input terminal for receiving a speech signal and one of a dual tone signal and a modulated signal, first coding means connected to said common input terminal for efficiently coding said speech signal to produce a first coded output, detecting means connected to said common input terminal for detecting said one of said dual tone signal and said modulated signal, second coding means connected to said common input terminal for coding said one of said dual tone and said modulated signal to produce a second coded output, and means for selecting one of said first and second coded outputs in response to an output of said detecting means; and

receiving means comprising separating means for separating a signal transmitted from said transmitting means into said first and second coded outputs, first decoding means for decoding said first coded output from said separating means, and second decoding means for decoding said second coded output from said separating means.

4,876,697
THREE-PART DECODER CIRCUIT

Arthur A. Whitfield, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 14, 1988, Ser. No. 206,553
Int. Cl.[4] H04L *25/49*; H03K *7/08*
U.S. Cl. 375—22 **6 Claims**



1. An electrical circuit suitable for decoding a binary data stream that has been encoded in a sequential bitcell code format, the encoding resulting in an encoded signal waveform that carries clock information and data information, which electrical circuit comprises:

(a) a separator means

(1) for inputting the encoded signal waveform and separating the clock information and the data information, and

(ii) for generating an output clock signal pulse train, and an output data signal pulse train;

(b) a clock timer for inputting the clock signal pulse train and generating a clock parameter CP that is a measure of a time elapsed between a first and a second clock signal pulse, for each of a succession of bitcells;

(c) a data timer for inputting the data signal pulse train, and the clock signal pulse train, and at the advent of the first clock signal pulse, generating a data parameter that is a measure of a time elapsed between the first clock signal pulse and a first data signal pulse, for each of a succession of bitcells;

and

(d) a comparer means for

(i) inputting the clock parameter CP,

(ii) inputting the data parameter,

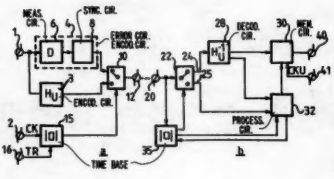
(iii) generating a parameter CP/2, and

(iv) generating a decoded output signal, the decoded output signal being assigned a first valuation if the data parameter is less than CP/2, and a second valuation if the data parameter is greater than CP/2.

4,876,698
SYSTEM FOR TRANSMITTING SEQUENCES OF DIGITAL SAMPLES ENCODED BY VARIABLE-LENGTH BINARY WORDS

Jean-Yves Boisson, Clamart, and Jean-Paul Bastien, Maisse, both of France, assignors to Telecommunications Radioelectriques et Telephoniques, Paris, France

Filed Jun. 24, 1988, Ser. No. 211,307
Claims priority, application France, Jul. 3, 1987, 87 09446
Int. Cl.[4] H04B *14/04*
U.S. Cl. 375—25 **1 Claim**



1. A system for transmitting and receiving sequences of digital samples, said system comprising:

(a) a transmitter device comprising means for encoding as variable length words a plurality of said sequences provided as words of a fixed length at an input thereof, a synchronizing means coupled to said encoding means for forming synchronizing words which define the position of respective ones of said variable length words within the sequences, a multiplexer means coupled to said synchronizing means for combining said synchronizing words with said variable length words and;

(b) a receiver device comprising demultiplexing means for providing at a first output said variable length words received from said transmitting device to a decoding means coupled thereto for recovering said fixed length words, and for providing at a second output said synchronizing words to a processing means coupled thereto for restoring in the event of a transmission error, the position of said digital samples in said sequences, characterized in that said system further comprises combining means for combining an error detecting code with said synchroniz-

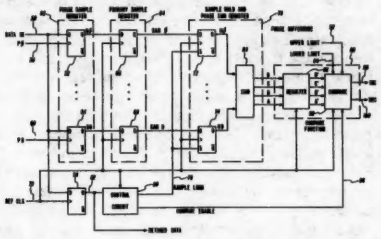
ing words and said synchronizing means comprises control means for distributing said synchronizing words combined with said error detection code.

4,876,699

HIGH SPEED SAMPLED DATA DIGITAL PHASE DETECTOR APPARATUS

Blaine J. Nelson, Plano, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 6, 1988, Ser. No. 190,914
Int. Cl.[4] H03D *3/18*
U.S. Cl. 375—82 **7 Claims**



1. High speed digital phase detector apparatus comprising, in combination:

signal supplying first means for supplying a plurality of first signals of the same frequency but each of a different relative phase with respect to a reference;

data signal supplying second means for supplying logic level changing data signals which change at a given maximum data rate;

clock signal third means for supplying a reference clock signal which periodically provides a given logic level change at a frequency which may be similar to that of the given maximum data rate but is not synchronized to the data signal;

logic signal fourth means, connected to said first, second and third means for receiving signals therefrom and including signal output means, for counting the number of first signals that change to a given logic level between the time of occurrence of commencement of a data signal and the time of occurrence of the given logic level change of said reference clock signal and providing an output fourth signal indicative of said count at said signal output thereof; and

compare fifth means, connected to said fourth means to receive the count fourth signal and including increment an decrement signal output means, for comparing the count value of said fourth signal with a predetermined allowable range of counts and providing one of an increment and decrement signal to said signal output means thereof in accordance with whether the count exceeds or is less than said predetermined allowable range.

4,876,700

DATA DEMODULATOR

Mervin L. Grindahl, Waseca, Minn., assignor to E. F. Johnson Company, Waseca, Minn.

Filed Apr. 16, 1986, Ser. No. 852,539
Int. Cl.[4] H04L *27/06*
U.S. Cl. 375—87 **20 Claims**

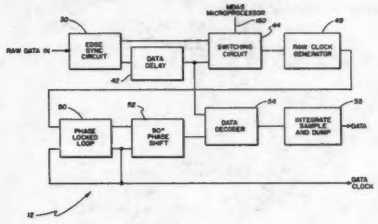
1. A data recovery circuit for demodulating transmitted encoded data comprising:

means for receiving the encoded data;

means for delaying the received encoded data for a delay time comprising a plurality of data bit time intervals;

means for recovering the transmitted data clock signal from either the received data during the delay time or from the delayed data after the delay time connected to the received data and to the delayed data;

means for switching the clock recovery means from the received data to the delayed data after a synchronization sequence of data bits has been received and for preventing



switching from taking place until the logic level of the received data and the logic level of the delayed data are the same; and

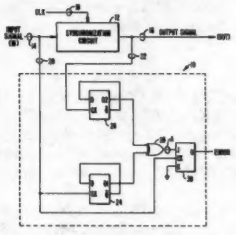
means for decoding the delayed data with the recovered data clock signal.

4,876,701

SYNCHRONIZATION FAILURE DETECTION

Martin W. Sanner, San Jose, Calif., assignor to Tandem Computers Incorporated, Cupertino, Calif.

Filed Nov. 30, 1987, Ser. No. 126,971
Int. Cl.[4] H04L *7/00*
U.S. Cl. 375—106 **7 Claims**



1. In a digital system, having synchronizing means operable to receive an asynchronously occurring input pulse to generate therefrom an output signal in the form of a representation of the input pulse having at least one digital state change synchronized to a transition of a digital clock signal, apparatus for monitoring the operation of the synchronizing means to determine that for each received input pulse a corresponding representation is produced, the apparatus comprising:

first circuit means, coupled to receive the asynchronously occurring input pulse and to note occurrence of the asynchronously occurring input pulse, for generating a first signal indicative of the noted occurrence of the asynchronously occurring input pulse;

second circuit means, coupled to receive the output signal of the synchronizing means and to note the appearance of the representation of the input pulse, for generating a second signal indicative of the noted appearance of the representation; and

third circuit means, coupled to receive the first and second signals and responsive to the occurrence of the asynchronously occurring input pulse, for producing therefrom an output error signal when the occurrence of the asynchronously occurring input signal is without a responsive

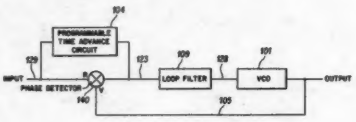
occurrence of the output signal of the synchronizing means.

4,876,702

PROGRAMMABLE TIME ADVANCE

Alan J. Lesko, Fort Collins, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 28, 1988, Ser. No. 225,123
Int. Cl.[4] H03L *7/10*
U.S. Cl. 375—120 **16 Claims**



10. A method of producing a programmable time advance for a clock generation circuit having an input control terminal comprising the steps of:

generating a clock signal having a predetermined center frequency, which center frequency is adjustable via the application of control signals to said input control terminal;

measuring the difference between a reference clock signal and said generated clock signal to produce a clock adjust signal to adjust said center frequency of said generated clock signal;

producing a clock advance signal of predetermined magnitude; and

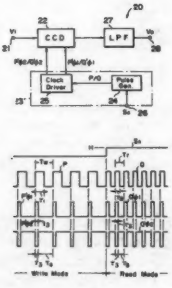
concurrently applying said clock advance signal and said clock adjust signal to said input control terminal of said clock generation circuit to advance the timing of said generated clock signal with respect to said reference clock signal by a fixed time offset.

4,876,703

APPARATUS FOR COMPRESSING AND/OR EXPANDING TIME BASE

Kaoru Urata, Kanagawa; Miaki Nakashio, Tokyo; Koichi Ono, Kanagawa; Hitoshi Hirai, Kanagawa, and Masayuki Iwamoto, Kanagawa, all of Japan, assignors to Sony Corp., Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 159,896
Claims priority, application Japan, Mar. 12, 1987, 62-57818
Int. Cl.[4] G11C *29/00*; H03K *23/46*
U.S. Cl. 377—62 **5 Claims**



1. Apparatus for compressing and/or expanding the time base of an input signal, comprising:

charge coupled device means having an input terminal supplied with said input signal, an output terminal, first and second clock terminals, and a charge transfer channel having at least one bent portion and through which charges corresponding to said input signal are transferred with the direction of the charge transfer being changed at said at least one bent portion at which some charges remain as a residual charges resulting in noise,

clock generating means for generating a write clock signal and a read clock signal in a time-divisional manner, said read clock signal and said write clock signal having a read clock period and a write clock period, respectively, which are different in length from each other, and

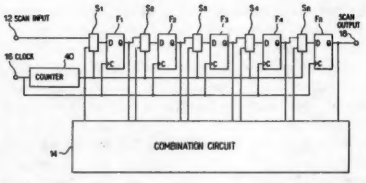
clock driver means supplied with one of said write and read clock signals selectively for generating first and second pulse trains to be supplied to said first and second clock terminals, respectively, when said write clock signal is supplied and for generating third and fourth pulse trains to be supplied to said first and second clock terminals, respectively, when said read clock signal is supplied, said first pulse train being 180° out of phase in respect to said second pulse train and said third pulse train being 180° out of phase in respect to said fourth pulse train, said first pulse train and said third pulse train having respective pulse widths that are equal to each other, and that are each smaller than one-half of the shorter one of said write clock period and read clock period, whereby to reduce said noise due to said residual charges in said bent portion of the charge transfer channel.

4,876,704

LOGIC INTEGRATED CIRCUIT FOR SCAN PATH SYSTEM

Hideharu Ozaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 22, 1987, Ser. No. 136,572
Claims priority, application Japan, Dec. 22, 1986, 61-307009
Int. Cl.[4] G01R *31/28*; G11C *19/00*
U.S. Cl. 377—70 **2 Claims**



1. A logic integrated circuit for performing scan path testing of a combination circuit having a plurality of outputs, comprising:

a plurality of flipflops coupled in a cascaded arrangement, each of said flipflops having a data input, a data output and a clock input;

a clock terminal commonly connected to the clock inputs of all the plurality of flipflops;

a scan input terminal connected to the data input of a first flipflop of said flipflops;

a scan output terminal connected to the data output of a last flipflop of said flipflops;

a plurality of selectors each located just before each of the flipflops, each of the selectors except a first selector having a first input connected to the data output of an immediately preceding flipflop, each of said selectors having a second input connected to a corresponding one of the outputs of the combination circuit, an output connected to the data input of an immediately succeeding flipflop and a selection control input; and

a counter having an input connected to the clock terminal

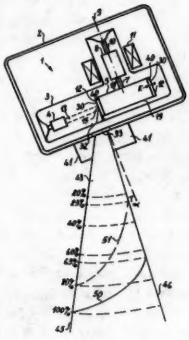
and an output connected to the selection control input of each selector, the counter generating a frequency division signal having a frequency division ratio equivalent to the number of the flipflops, so that when the counter does not generate a frequency division signal, selectors supply the data output of an immediately preceding flipflop to the data input of the immediately succeeding flipflop whereby a shift register is formed by all the flipflops, and when the counter generates the frequency division signal, selectors supply the corresponding output of the combination circuit to the data input of the immediately succeeding flipflop whereby the flipflops do not form the shift register and function to latch the corresponding outputs of the combination circuit.

4,876,705

X-RAY TUBE WITH A MOLYBDENUM TARGET

Jacques Delair, Bois D'Arcy, and Olivier Peyret, Boulogne Billancourt, both of France, assignors to General Electric CGR S.A., Paris, France

Filed Nov. 10, 1988, Ser. No. 269,719
Claims priority, application France, Nov. 13, 1987, 87 15671
Int. Cl.[4] H01J *35/10*
U.S. Cl. 378—144 7 Claims



1. An X-ray tube comprising an anode and a cathode, with the cathode delivering an electron beam and the anode comprising a target impinged by the electron beam on a surface forming the source of an X-radiation, said target being made of molybdenum, wherein the molybdenum is alloyed with vanadium in a proportion, by weight, of at least 0.5%.

4,876,706

SHEET FILM PACKAGE

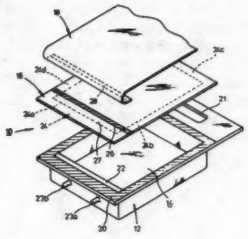
Kenji Tajima, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 21, 1987, Ser. No. 98,824
Claims priority, application Japan, Sep. 19, 1986, 61-221593
Int. Cl.[4] G03B *42/04*
U.S. Cl. 378—174 5 Claims

1. A sheet film package comprising:

a tray for storing a stack of sheet films, said tray having a film access opening;

a flexible first cover member peelably joined at a portion to said tray for closing said film access opening to hold said sheet films under light-shielded conditions, said first cover member having a peeling-starting area where said first cover member starts to be peeled off, said peeling-starting area being unjoined to said tray and located inwardly of the joined portion thereof, wherein said first cover member includes a cut-off area provided between an edge portion of the tray and said peeling-starting area; and



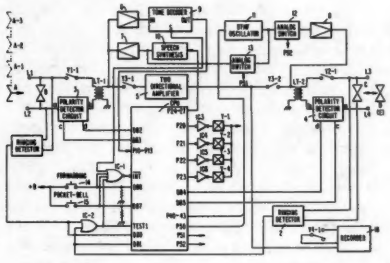
a second cover member joined to said first cover member inwardly of said peeling-starting area.

4,876,707

TWO-DIRECTIONAL CALL FORWARDING DEVICE

Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Apr. 14, 1988, Ser. No. 183,532
Claims priority, application Japan, Apr. 14, 1988, 62-91377
Int. Cl.[4] H04M *1/57, 1/64, 11/00*
U.S. Cl. 379—57 4 Claims



1. A tow-directional call forwarding device for receiving at a telephone set B incoming calls from general calling parties at telephone sets A, A-1, A-2, A-3 . . . , and through a telephone set C, dialing a number of a called party at a telephone set D or initiating paging of a pocket bell carrier set E, comprising:

a memory:

means for successively storing into said memory telephone numbers of set A-1, A-2, A-3, . . . , when the called party at set D does not answer the calls sent by the telephone sets of said calling parties;

means for engaging the telephone B when the called party at set D or at the pocket bell carrier set at E calls the telephone C thereafter, reading out successively a plurality of said telephone numbers stored in said memory, and for automatically and successively dialing said telephone numbers of said sets A, A-1, A-2, A-3 . . . for placing calls thereto through the telephone set B after each call to said set A, A-1, A-2, A-3 . . . is completed; and

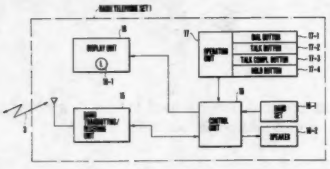
means for forming a loop between said set D and a particular one of said telephone sets A-1, A-2, A-3, when said set A answers a call from set D to the particular set A-1, A-2, A-3, through the telephone set B.

4,876,708

CORDLESS TELEPHONE SYSTEM

Noboru Saegusa; Toshihiro Hara; Ryoji Kawasaki, all of Tokyo; Kazuyuki Tate, Aichi; Syoji Hase, Tokyo, and Koji Ono, Tokyo, all of Japan, assignors to NEC Corporation; Nippon Telegraph and Telephone Corp., both of Tokyo and Kabushiki Kaisha Toshiba, Kanagawa, all of, Japan

Filed Oct. 27, 1987, Ser. No. 112,927
Claims priority, application Japan, Oct. 30, 1986, 61-258745
Int. Cl.[4] H04M *11/00, 1/00*
U.S. Cl. 379—61 6 Claims



1. A cordless telephone system comprising at least one radio telephone set, a subscriber line connected through a telephone exchanger to a subscriber telephone set, and connector means, connected to said at least one radio telephone set through a radio channel and to said subscriber line and having a function for establishing a communication channel between said at least one radio telephone set and said subscriber telephone set and a function for holding said communication channel in response to a hold signal from said at least one radio telephone set, wherein said connector means comprises:

first hold state setting means for setting said communication channel in a first hold state without disconnecting said radio channel in response to the hold signal received upon establishment of said communication channel;

first determining means for determining the presence/absence of a radio reception signal within a first predetermined period of time after the first hold state is initiated;

hold state releasing means for releasing the first hold state and reconnecting the communication channel when the radio reception signal received at first within the first predetermined priod of time is the hold signal in accordance with a determination result of said first determining means;

second hold state setting means for disconnecting said radio channel and setting said communication channel in a second hold state when the radio reception signal received at first within the first predetermined period of time is an on-hook signal or the radio reception signal is not received within the first predetermined period of time, in accordance with the determination result of said first determining means;

second determining means for determining the presence/absence of the radio reception signal within a second predetermined period of time after the second hold state is initiated;

hold state changing means for changing the second hold state to the first hold state when the radio reception signal received within the second predetermined period of time is an off-hook signal, in accordance with a determination result of said second determining means; and

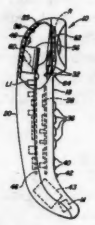
circuit control means for forcibly disconnecting said communication channel and setting said communication channel in a stand-by state when the radio reception signal is not received within the second predetermined period of time, in accordance with the determination result of said second determining means.

4,876,709

ANTENNA FOR CORDLESS TELEPHONE SYSTEM

Max W. Rogers, Franklin Park, and Daniel R. Skinner, Grayslake, both of Ill., assignors to Dynascan Corporation, Chicago, Ill.

Filed Sep. 8, 1988, Ser. No. 240,702
Int. Cl.[4] H04R *1/38*
U.S. Cl. 379—61 31 Claims



1. In a cordless telephone handset containing transmitter-receiver means contained within an elongated hand-grippable handset housing having ear-receiving and sound-accepting portions, said ear-receiving and sound-accepting handset housing portions each having a front wall configured to be placed adjacent to the user's face in use and a rear wall spaced apart from said front wall, and side walls joiningly extending between said front and rear handset housing walls, said transmitter-receiver means having a handset chassis ground and including earphone transducer means disposed in said ear-receiving handset housing portion for generating sound waves from electrical signals, microphone transducer means disposed in said sound-accepting housing portion for generating electrical signals from sound waves, antenna means for receiving and transmitting electromagnetic waves, and coupling network means for coupling said transmitter-receiver means to said antenna, said handset antenna means being counterpoised against said handset chassis and isolated at a distance therefrom, said handset housing being configured to be normally gripped by the user at a housing gripping portion at a distance from said handset antenna the improvement comprising:

said handset antenna means configured as a plate-shaped means having its longest dimension much less than one-fourth of the operating wavelength of said transmitter-receiver means and disposed to be spaced from said housing gripping portion, a major dimension of said antennas means being disposed to extend in a generally vertical direction when said handset housing is in position for use.

4,876,710

METHOD AND APPARATUS FOR CORDLESS MICROPHONE COMMUNICATION SYSTEM

John D. Reed, Arlington, Tex.; Teddy P. Roberts, Fort Wayne, Ind., and Thomas R. Berger, Crystal Lake, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 917,923, Oct. 10, 1986, Pat. No. 4,748,685. This application Jan. 5, 1987, Ser. No. 2,332
Int. Cl.[4] H01B *1/10*
U.S. Cl. 379—63 2 Claims

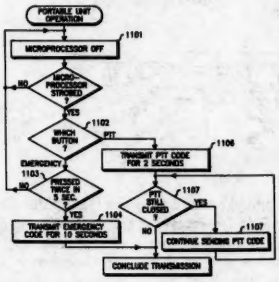
1. In a communications system comprising vehicle mounted transceiver means for receiving an input message and for transmitting a signal comprised of said input message as modulated with a first carrier frequency signal, an improvement comprising:

portable transmitter means for transmitting a message signal and an ID signal as modulated with a second carrier frequency signal, the portable transmitter means including:

push-to-talk switch means for providing a push-to-talk signal;

strobe means responsive to said push-to-talk signal for providing an initial strobe signal;

microprocessor means responsive to said strobe signal controlling transmission of said ID signal; wherein said microprocessor means are usually switched off until said microprocessor means receives said strobe signal;



vehicle mounted received means for receiving said message signal and said ID signal, for providing said message signal to said transceiver means, and for allowing said transceiver means to transmit said message signal as said input message when said ID signal represents a proper ID signal.

4,876,711

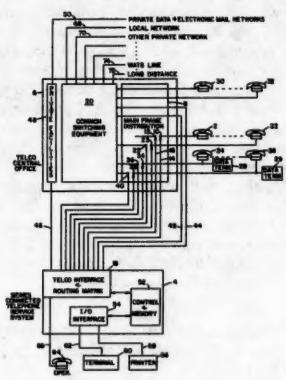
SERIES CONNECTED TELEPHONE SERVICE SYSTEM

William J. Curtis, 4037 Tokay Blvd., Madison, Wis. 53711

Continuation of Ser. No. 285,938, Jul. 23, 1981, abandoned. This application Dec. 7, 1987, Ser. No. 132,700

Int. Cl.[4] H04M *3/50, 3/56, 11/00*

U.S. Cl. 379—94 19 Claims



9. A series connected telephone service system, said system comprising:

telephone answering means located remote from an associated telephone central office and including:

means for intercepting calls to a subscriber telephone and directing such calls to said telephone answering means and

an operator controlled means for answering calls directed to a subscriber telephone;

an independent telephone line extending between the telephone central office and said system and coupling said system to the central office;

a control switching means coupled in a series connection in between each of a plurality of subscriber telephone lines and corresponding central office telephone lines associated with such subscribers,

said control switching means including bridging means for coupling a selected one of the plurality of subscriber telephone lines to a telephone line to the central office for placement and receipt of calls for enabling normal service,

said bridging means further operable for connecting said operator controlled means to the subscriber telephone for announcing an incoming call while holding the incoming call, and

special service means for providing special services to the subscriber by acting as an intercept between the subscriber telephone and the central office, and

control means operable upon command for coupling a selected one of the plurality of subscriber telephones to said independent line to the central office for placement of outgoing calls thereon and for leaving free the central office line associated with said subscriber to receive other calls to enable said system to communicate in both directions between the central office and the subscriber telephone.

4,876,712

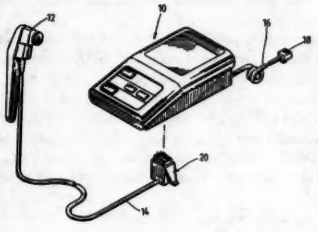
PROGRAMMABLE TELEPHONE AMPLIFIER CIRCUIT INTERFACE

Gary T. Brint, Scotts Valley; Gabriele Bungardt, Santa Cruz; Jerel C. Gedecke, San Jose; Robert L. Harris, Aptos, and Vladimir Kraz, Santa Cruz, all of Calif., assignors to Electronics, Inc., Santa Cruz, Calif.

Filed Dec. 9, 1988, Ser. No. 282,278

Int. Cl.[4] H04M *1/62*

U.S. Cl. 379—387 10 Claims



1. Apparatus for interfacing a two-way voice communication instrument to a communication link, comprising:

a signal conditioning circuit having a transmit signal channel and a receive signal channel, the circuit being programmable by an electrical input signal to establish a signal conditioning characteristic of at least one of the channels;

a first wire connection adapted to couple the signal conditioning circuit to a telephone link;

a second wire connection adapted to couple the signal conditioning circuit to a voice communication instrument;

a connector coupled in the second wire connection between the signal conditioning circuit and a voice communication instrument; and

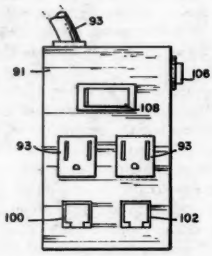
means carried by the connector for providing the electrical input signal to program the signal conditioning circuit.

4,876,713

SIGNAL CIRCUIT PROTECTOR DEVICE FOR CONSUMER USE

John J. Crosby, Gorham, and John J. Napiorkowski, Cape Elizabeth, both of Me., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 31, 1988, Ser. No. 213,950
Int. Cl.[4] H04M 1/74
U.S. Cl. 379—412 4 Claims



1. A solid state protector device for protecting a consumer's solid state electronic telephone equipment from abnormal voltage and current surges comprising:

an enclosure made of electrically non-conductive material having front, rear, side, top and botton walls;

a protector circuit means for protecting electronic equipment from abnormal current and voltage surges comprising first and second circuit portions;

said first protector circuit portion comprising:

a pair of input terminals;

a pair of output terminals for connection across the electronic equipment;

a voltage sensitive switch means connected across said output terminals;

a variable resistance means connected in series with said electronic equipment between one of the input terminals and one of the output terminals before said voltage sensitive switch mears; and

a ground means connected in series with said voltage sensitive switch means between said output terminals;

said second protector circuit portion comprising:

resistance means connected in series with said electronic equipment between said input terminals and the output terminals before said voltage sensitive switch means:

a printed circuit board means disposed within said enclosure and dividing said enclosure into first and second chambers;

said first protector circuit portion being disposed in said first chamber and said second protector circuit portion being disposed in said second chamber portion;

said printed circuit board means being operable to electrically connect said first and second protector crcuit portions and to provide access to said input and output terminals and said ground means within said second chamber;

an input connector for receiving an input circuit signal disposed in the front wall of said second chamber and electrically connected to the input terminal of said protector circuit;

an output connector for conducting said signal circuit to the electronic equipment to be protected disposed in the front wall of said chamber and electrically connected to the output terminal of said protector circuit; and

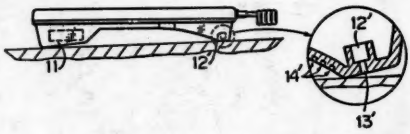
a plug means for connection to an outside ground means disposed in the rear wall of said second chamber and electrically connected to said ground means.

4,876,714

TELEPHONE SET

Shigeyuki Yoshida; Atsushi Musha, and Takayuki Nonami, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 15, 1987, Ser. No. 4,085
Claims priority, application Japan, Jan. 30, 1986, 61-13442
Int. Cl.[4] H04M 1/19
U.S. Cl. 379—433 7 Claims



1. In a telephone handset having a transmitter for generating sound, a receiver for receiving sound, and a handset housing incorporating said transmitter and said receiver substantially on said first side and at respective transmitter and receiver handset housing sections, the improvement wherein said handset housing is generally oblong in shape, having a first and a second end and said transmitter is mounted at said first end and said receiver is mounted at said second end and said transmitter and said receiver are positioned in said housing so that when said telephone set is placed on a flat surface with said transmitter and said receiver facing said flat surface, a sound-impervious portion of said housing contacts said surface at a contact line formed between said transmitter and said receiver, said contact line extending substantially orthogonal to a line joining the transmitter and receiver and substantially across the width of said housing both said transmitter and receiver housing sections comprising acoustic-coupling aperture means respectively subscribing an aperture means coupling area, said sound impervious contact line extending a length across the width of said housing that is greater than both said respective aperture means coupling areas whereby said housing acts as a sound baffle at the contact line and sound generated by said transmitter and reflected from said surface cannot directly enter said receiver, both said transmitter and receiver handset housing sections having a housing section wall extending along a predetermined plane and having defined therein said acoustic-coupling aperture means for the coupling of acoustic signals along a predetermined axis that is substantially orthogonal to said predetermined plane, said transmitter and receiver housing section walls being formed so that at least one of said aperture means predetermined axes extends in a direction out of normal to said flat surface, said aperture means predetermined axes extending in a direction away from said handset housing and diverging therefrom whereby acoustic signals radiated from said transmitter are, in addition to being baffled by said sound-impervious portion, directed away from said receiver.

4,876,715

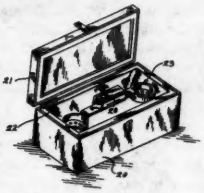
SANITIZING DEVICE FOR A TELEPHONE

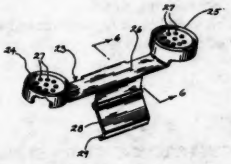
Donald F. Neubert, W225 N4007 Grandview Dr., Pewaukee, Wis. 53072

Filed Oct. 26, 1988, Ser. No. 263,013
Int. Cl.[4] H04R 1/12
U.S. Cl. 379—452 11 Claims

7. A sanitizing device for a telephone comprising a housing having a pair of first openings disposed to receive the mouthpiece and earpiece of a telephone respectively, a nested stack of sanitized generally cup shaped filters disposed within each of said first openings, an adhesive on the inner surface of each filter and disposed to engage the outer surface of the respective mouthpiece and earpiece as the mouthpiece and earpiece are inserted within said first openings to thereby adhere said filters to the respective mouthpiece and earpiece, said housing having a plurality of second openings disposed to receive the mouth-

piece and earpiece respectively, and means associated with each of said second openings for removing the filters from the





mouthpiece and earpiece as the mouthpiece and earpiece are inserted and withdrawn from said second openings.

4,876,716

KEY DISTRIBUTION METHOD

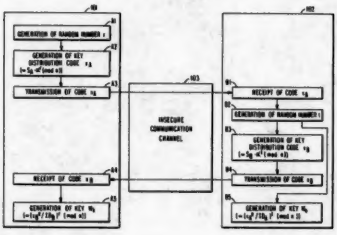
Eiji Okamoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 24, 1987, Ser. No. 88,319

Claims priority, application Japan, Aug. 22, 1986, 61-197610; Aug. 22, 1986, 61-197611

Int. Cl.[4] H04L *9/02*; H04K *1/00*

U.S. Cl. 380—21 **12 Claims**



1. A key distribution method comprising the following steps:

(a) generating a first random number in a first system in use by a first converser;

(b) generating first key distribution information in said first system by applying a predetermined first transformation to said first random number on the basis of first secret information;

(c) transmitting said first key distribution information to a second system in use by a second converser via a communication channel;

(d) receiving said first key distribution information in said second system;

(e) generating a second random number in said second system;

(f) generating second key distribution information by applying said predetermined first transformation to said second random number on the basis of second secret information;

(g) transmitting said second key distribution information to said first system via said communication channel;

(h) receiving said second key distribution information in said first system; and

(i) generating an enciphering key in said first system by applying a predetermined second transformation to said second key distribution information on the basis of said first random number and identification information of said second converser.

4,876,717

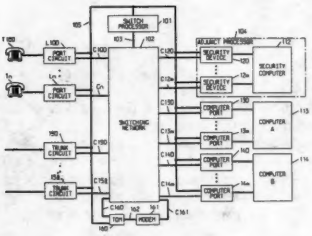
ADJUNCT PROCESSOR FOR PROVIDING COMPUTER FACILITY ACCESS PROTECTION VIA CALL TRANSFER

Salvador Barron, Westminster, and James E. Coffman, Boulder, both of Colo., assignors to American Telephone and Telegraph Company and AT&T Information Systems, Morristown, N.J.

Continuation of Ser. No. 913,288, Sep. 30, 1986, abandoned. This application Jun. 3, 1988, Ser. No. 205,054

Int. Cl.[4] H04L *9/00*

U.S. Cl. 380—25 **14 Claims**



1. In a business communication system which serves a plurality of communication devices, each of which is connected by an associated port circuit to a switching network of said business communication system, and a plurality of computer facilities, each of which is connected to said switching network by one or more computer port circuits, said switching network having a plurality of ports, a method of providing computer port access security comprising the steps of:

interdicting all calls from any calling one of said communication devices to any of said plurality of computer facilities;

in response to a call request from said calling communication device, said call request defining one of said plurality of computer facilities, establishing a digital call connection from said calling communication device through said switching network to an adjunct processor connected to a first one of said plurality of ports of said switching network;

confirming the identity of the user at said calling communication device in said adjunct processor by exchanging information between said user and said adjunct processor;

disconnecting said calling communication device from said adjunct processor;

originating a new digital call connection from said adjunct processor to a preassigned telephone number associated with said user;

determining, by said adjunct processor, the one of said plurality of computer facilities defined by said call request; and

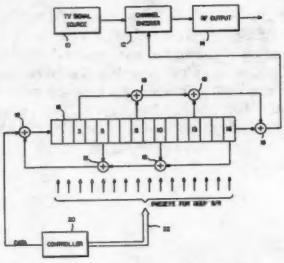
effecting, by said adjunct processor, data call transfer of said new digital call connection from said first port of said switching network connected to said adjunct processor, to a second one of said plurality of ports of said switching network, said second port being connected to one of said computer port circuits associated with one of said plurality of computer facilities determined by said adjunct processor.

4,876,718

SECURE DATA PACKET TRANSMISSION SYSTEM AND METHOD

Richard W. Citta, Oak Park; Paul M. Gosc, Buffalo Grove; Dennis M. Mutzabaugh, and Gary J. Sgrignoli, both of Mount Prospect, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Division of Ser. No. 25,236, Mar. 12, 1987, Pat. No. 4,771,458.
This application Jul. 19, 1988, Ser. No. 221,166
Int. Cl.[4] H04L 9/02; H04N 7/167
U.S. Cl. 380—42 12 Claims



1. A method of operating a data packet communication system comprising the steps of:

formatting data into binary data packets;

processing said binary data packets by division and multiplication by different factors to simultaneously encrypt and error protect said binary data packets; and

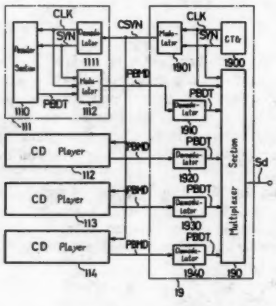
transmitting the processed binary data packets.

4,876,719

SYNCHRONIZING SYSTEM FOR DIGITAL APPARATUS

Tarp Makagami; Takeshi Fukami, both of Kanagawa, and Toshiro Terauchi, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 10, 1987, Ser. No. 37,382
Claims priority, application Japan, Apr. 10, 1986, 61-82550
Int. Cl.[4] H04S 1/00
U.S. Cl. 381—1 8 Claims



1. A synchronizing system for use with a plurality of digital signal reproducers comprising;

a plurality of digital signal reproducers, each producing an output signal and having a digital I/O modulator, a digital I/O demodulator and a decoder for producing decoded data,

a digital signal multiplexer supplied with the output signals from said plurality of digital signal reproducers, and for producing a frame synchronizing signal and a multiplex output signal,

said digital signal multiplexer including means for generating a clock pulse and a word synchronizing signal, a digital I/O modulator, and digital I/O demodulator for each of said reproducers,

circuit connecting means for interfacing the digital I/O modulator of said digital signal multiplexer and each digital I/O demodulator of said plurality of digital signal reproducers, so as to supply a demodulated clock pulse and a word synchronizing signal to each decoder thereof, and

circuit connecting means for interfacing said digital I/O modulator of each of said plurality of digital signal reproducers and the respective digital I/O demodulator of said digital signal multiplexer so as to transmit said decoded data of each said decoder to said digital signal multiplexer, said digital signal multiplexer producing a time-division multiplex signal arranged in a frame format including;

(a) a word synchronizing signal,

(b) a service bit signal indicating a transmission mode, and

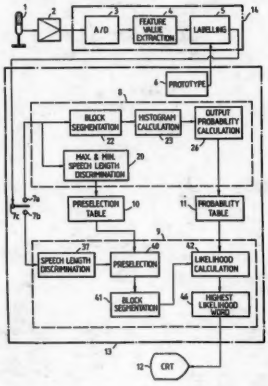
(c) a channel of digital data whereby the digital signals from said plurality of digital reproducers are multiplexed as indicated by said service bit signal.

4,876,720

SPEECH RECOGNITION SYSTEM

Toyohisa Kaneko, Tokyo, and Osaaki Watanuki, Kawasaki, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 12, 1987, Ser. No. 25,126
Claims priority, application Japan, Mar. 25, 1986, 65028/86
Int. Cl.[4] G10L 1/00
U.S. Cl. 381—43 12 Claims



1. A speech recognition system comprising:

means for storing probabilities of each of a plurality of labels being produced in each of a plurality of first segments in each of a plurality of recognition units;

means for generating a label string from an input unit;

means for segmenting said label string into a plurality of second segments, each corresponding to each of said first segments;

means for calculating, for each recognition unit, a likelihood that said input unit represents the recognition unit, by reading out from said storing means, for each of said labels in said label string, said probabilities of each of said labels associated with said one recognition unit and corresponding to each of said labels in said label string, according to the identity of each of said labels in said label string and the identity of each of said second segments to which each of said labels in said label string belongs;

means for determining a recognition unit having the highest likelihood among said recognition units, as a recognition

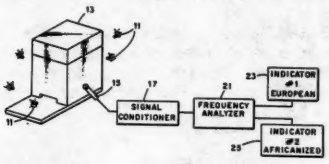
result, according to the outputs of said likelihood calculating means.

4,876,721

METHOD AND DEVICE FOR IDENTIFYING DIFFERENT SPECIES OF HONEYBEES

Howard T. Kerr, Maryville; Michael E. Buchanan, Lenoir City, and Kenneth H. Valentine, Knoxville, all of Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Filed Mar. 3, 1988, Ser. No. 163,673
Int. Cl.[4] H04R *29/00*
U.S. Cl. 358—56 13 Claims



1. A method of identifying at least two different species of honeybees whose wing movements produce distinctly different distinguishing frequency bands for each said species within an acoustical signal spectra, comprising the steps of:

detecting said acoustical signal spectra produced by said honeybees to be identified; and

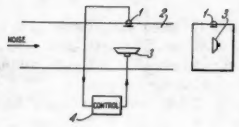
analyzing said detected acoustical signal spectra simultaneously with at least two frequency responsive circuits, one of said circuits responsive to a frequency band of one of said species and a second of said circuits responsive to a frequency band of a second of said species, to determine the presence of said distinguishing frequency bands specific to the identity of a particular species as an indication of the species of said honeybees being identified.

4,876,722

ACTIVE NOISE CONTROL

Nicolaas M. J. Dekker; John W. Edwards, both of Pinner, and Adrian W. James, London, all of England, assignors to The General Electric Company, p.l.c., England

Filed May 13, 1988, Ser. No. 193,801
Int. Cl.[4] A61F *11/02;* H03B *29/00*
U.S. Cl. 381—71 8 Claims



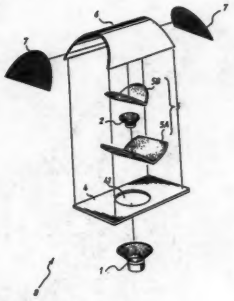
1. An active noise control system for reducing the amount of noise propagated through a duct, comprising: a microphone incorporated in a wall of said duct, and operative for detecting the sound of the propagated noise; a source of anti-sound mounted substantially at the center of a transverse cross-section of said duct; and a control circuit responsive to the magnitude of the sound detected by the microphone for driving the anti-sound source to substantially suppress first transverse mode excitation in said duct.

4,876,723

LOUDSPEAKER SYSTEM

Jimmy Fang, Taipei, Taiwan, assignor to Peter Tsung-Hou Fei, Calif.

Filed Nov. 30, 1988, Ser. No. 278,026
Int. Cl.[4] H05K *5/00*
U.S. Cl. 381—182 3 Claims



1. A coaxial-type multi-speaker system for use in a motor vehicle comprising:

a low frequency transducer;

a high frequency transducer; and

a cover, said cover including an elongated substantially half-cylindrical periphery having two oppositely disposed terminating ends with lower sections thereof inclined downwardly and outwardly from the terminating ends of the corresponding upper sections;

a rigid flat bottom of which length and width are equal to those of the elongated half-cylindrical periphery, said flat bottom having a central aperture, with the low frequency transducer attached to flat bottom and a membrane of said transducer facing such aperture;

and mounted between said cover and said flat bottom, an upper and lower section as defined by two sound reflector panels of substantially V-shaped cross section each panel-formed with a pair of angled members, each panel mounted perpendicularly to the length of said elongated substantially half-cylindrical periphery and in double level fashion, an apex portion of a lower level sound reflector panel facing the center of the membrane of the low frequency transducer, the high frequency transducer fixed between the two angled members of the lower level sound reflecting panel, and an upper level sound reflecting panel attached to the underside of the half-cylindrical periphery with an apex portion thereof facing the center of a membrane of the high frequency transducer.

4,876,724

PERSONAL SOUND SYSTEM

Osami Suzuki, Glenrock, N.J., assignor to Toshiba America, Inc., Wayne, N.J.

Filed Apr. 29, 1988, Ser. No. 188,221
Int. Cl.[4] H04R *1/02;* A41D *1/02, 27/20;* H04M *1/05*
U.S. Cl. 381—187 13 Claims

1. A personal sound system comprising:

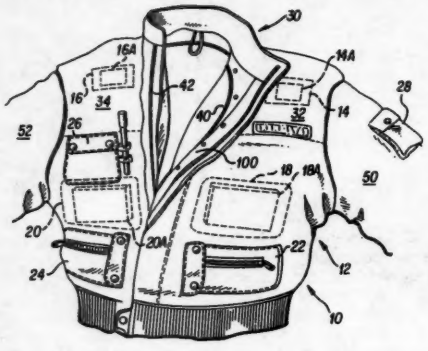
a. a garment adapted to substantially cover a person's upper torso, said garment having portions encircling a person's neck and depending forwardly and rearwardly from the person's right and left shoulders;

b. first means for removably supporting a first speaker on said garment in the vicinity of one of the person's shoulders;

c. second means for removably supporting a second speaker on said garment in the vicinity of the person's other shoulder;

d. third means for removably supporting an electrical signal producing device on said garment, said third means is adjacent said second means; and

e. fourth means for removably supporting flexible wires on said garment, which wires are adapted to removably connect between said third means and said first and second means to permit transmission of an electrical signal from said electrical signal producing device to said first and second speakers over said wires and to permit removal of said wires from said garment is to be cleaned, said fourth means comprising a flap extended from said third means to said second means and through that portion of said garment encircling the person's neck to said first means.

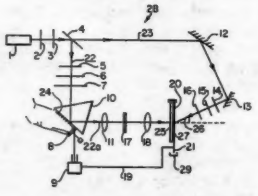


4,876,725

METHOD AND APPARATUS FOR FINGERPRINT VERIFICATION

George J. Tomko, Toronto, Canada, assignor to Mytec Technologies Inc., Toronto, Canada

Filed Oct. 8, 1987, Ser. No. 105,615
Int. Cl.[4] G06K 9/00
U.S. Cl. 382—4 11 Claims



1. An optical processor fingerprint verification apparatus comprising:

(a) a source of incoherent light for providing an illuminating beam along a beam path;

(b) input means including means to receive at least one fingerprint or fingerprint recording of an individual located in said beam path for producing an optical information beam modulated with data from said at least one fingerprint or fingerprint recording along an optical information beam path;

(c) optical Fourier transform means in said optical information beam path for providing a Fourier transformed optical information beam in a transform plane;

(d) supporting means for supporting a reference data record including a pre-recorded reflection hologram of at least one reference fingerprint in said transform plane, said pre-recorded reflection hologram for reflecting and filtering a Fourier transformed optical information beam to provide light having an intensity distribution representing the correlation between said pre-recorded reflection hologram and said Fourier transformed optical information beam; and

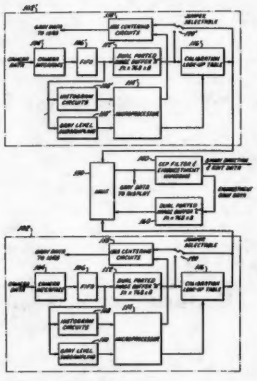
(e) verification indicating means responsive to the intensity distribution of light reflected from said pre-recorded reflection hologram when said pre-recorded reflection hologram is illuminated by a Fourier transformed optical information beam.

4,876,726

METHOD AND APPARATUS FOR CONTEXTUAL DATA ENHANCEMENT

Richard D. Capello, Orange, and George R. Mabry, Fullerton, both of Calif., assignors to De La Rue Printrak, Inc., Anaheim, Calif.

Filed Jan. 7, 1986, Ser. No. 816,865
Int. Cl.[4] G06K 9/00
U.S. Cl. 382—4 108 Claims



1. A method for enhancing data contained in data elements of an N×M matrix of data elements, each data element containing data representative of an intensity within a range of intensities, the method comprising:

(a) selecting a Y×Y direction estimate scan window of data elements, from within the N×M matrix, with Y<N, Y<M, and wherein said window has a center data element;

(b) taking the cumulative sum of the differences in the intensity values for each of a plurality of pairs of data elements which are spaced apart by a selected number of data elements, and each comprising one of the data elements in a respective one of a plurality of different slits, wherein each different slit represents a different slit direction and wherein the respective one of a plurality of different slits contains the center data element and is within the direction estimate scan window; and

(c) assigning a direction estimate to the center data element

based upon a comparison of the cumulative sum of such differences for the respective slits.

4,876,727

METHOD AND APPARATUS FOR DETECTING FAULTS IN AN OBJECT

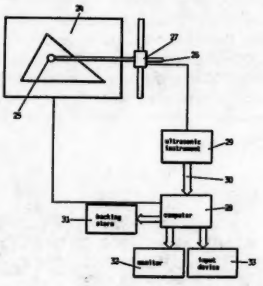
Albrecht Maurer, Seligenstadt, and Josef Fabian, Hanau, both of Fed. Rep. of Germany, assignors to Nukem GmbH, Hanau, Fed. Rep. of Germany

Filed Jan. 30, 1987, Ser. No. 8,950

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1986, 3604111

Int. Cl.[4] G06K 9/62

U.S. Cl. 382—8 10 Claims



1. A method for nondestructively detecting faults in and an object comprising the steps of:

measuring fault related values at various points of said object;

storing said measured fault related values with respect to a coordinate system in memory locations;

obtaining master values which relate to an object not having faults;

storing said master values with respect to said coordinate system in memory locations;

comparing said measured values and said master values to each other so that corresponding edges or corners are found;

aligning said measured values and said master values by restoring said measured values in said memory so that said corresponding edges and corners have corresponding coordinates to said master values;

defining partial areas of said aligned measured values and corresponding partial areas of said aligned master values so that each of said partial areas and corresponding partial areas have the same coordinate distances from said edge;

aligning said measured values in said partial areas and said master values in said corresponding partial area by restoring said measured values of said corresponding partial areas in memory locations to obtain minimal differences between said measured values and master values; and

determining a fault difference between said twice aligned measured values in said partial areas and said twice aligned master values in said corresponding partial areas to determine if said fault exists.

4,876,728

VISION SYSTEM FOR DISTINGUISHING TOUCHING PARTS

Scott D. Roth, Rowland Heights, Calif., assignor to Adept Technology, Inc., San Jose, Calif.

Continuation of Ser. No. 741,313, Jun. 4, 1985, abandoned. This application Nov. 20, 1987, Ser. No. 124,408

Int. Cl.[4] G06K 9/48

U.S. Cl. 382—21 20 Claims

1. In a vision system for identifying touching parts, a method for identifying an object independent of the orientation of said object, comprising the steps of

(a) developing sensory data comprising an image of said object;

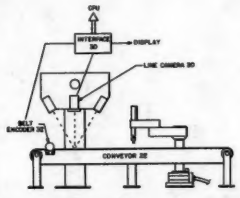
(b) separating closed regions from background by connectivity analysis of the data representing said image;

(c) developing a chain encoded representation of a region boundary of each of said closed regions of said image;

(d) fitting edge segments to the chain encoded representation of each region boundary to produce a more succinct representation of the boundary of each of said closed regions of said image;

(e) fitting straight line and circular arc segments to the edge segments to create edges and corners which characterize said image;

(f) classifying said straight line and circular arc segments by



feature classes, each said feature class describing a group of related features with a specific range of lengths, radii, included angles and/or angular ranges, one or more of said feature classes being associated with each of a plurality of prototypes stored in memory of said vision system to facilitate matching said image with one or more of said plurality of prototypes;

(g) proposing a match of an image of said object to said prototype based on said feature present in said object being classified in feature classes associated with said prototype; and

(h) verifying the match of the object and the prototype by translation and rotation of a region boundary of the prototype to align with the image of the object to match features of said image with features of said prototype whereby the object can be identified even when overlying another part.

4,876,729

METHOD OF IDENTIFYING OBJECTS

Yuji Watanabe, Hirakata, and Masahiro Nakamura, Osaki, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Continuation of Ser. No. 147,088, Jan. 2, 1988, abandoned, which is a continuation of Ser. No. 703,989, Feb. 21, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 271,405

Claims priority, application Japan, Feb. 21, 1984, 59-31043; Apr. 20, 1984, 59-80763

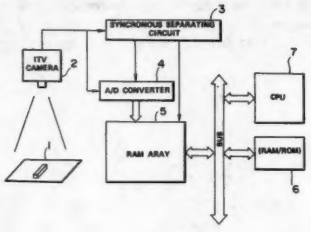
Int. Cl.[4] G06K 9/48

U.S. Cl. 382—22 5 Claims

1. A method of identifying an object to be detected wherein said object is photgraphed and is identified by detecting a portion of a contour line of the detection object from a photographed input picture image data, said method comprising the steps of:

preparing a filter means for designating a plurality of filter element data sets, each of said filter element data sets consisting of a first data indicative of the amounts of offset in two given points from a reference point, said two points being set in a manner such that one of the two points is placed inside of the photographed input picture image data of said detection object and the other one of the two points is placed outside of the photographed input picture

image data of said detection object along the boundary of said contour line so as to sandwich the portion of the contour line of said detection object, a second data indicative of a threshold value of a brightness difference between picture image data of said input picture image data corresponding these two points, and a third data indicative of a condition about a gradient in the brightness between picture image data corresponding to the two points, the number of said filter element data sets being determined according to a number by which a shape of the detection object can be determined, said filter element data sets being previously registered in a proper memory;



trace scanning said input picture image on the basis of said filter means; and

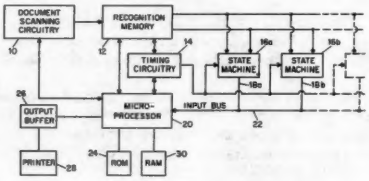
identifying that the object is present when the brightness difference between the picture image data corresponding to the two points and represented by said first data exceed respective threshold values represented by said second data simultaneously with respect to all said filter element data sets and also when the brightness gradient between the picture image data corresponding to the two points satisfies the corresponding condition represented by said third data with respect to all said filter element data sets.

4,876,730

OPTICAL CHARACTER READER WITH SKEW RECOGNITION

Ronald H. Britt, Leicester, England, assignor to Lundy ELectronics & Systems, Inc., Charlotte, N.C.

Filed Feb. 25, 1987, Ser. No. 18,585
Int. Cl.[4] G06K *9/00, 9/70*
U.S. Cl. 382—37 **4 Claims**



1. An optical character recognition system comprising:

optically sensitive means for scanning characters on a document, and for producing successively bit strings representing the black character bits or white background bits in slices of each character in sequence;

a plurality of state machines connected to receive said bit strings, with each state machine being provided for each different associated character by programming each state machine with a different program table, and wherein each state machine changes state in accordance with its program table in response to receipt of said bit strings, each of said program tables providing, in sequence, a plurality of positive pattern tests, characteristic of its associated character, against which said received bit strings are compared, and wherein each program table compares a received bit string with the same positive reference pattern in a positive reference pattern test until a received bit string compares favorably with the positive reference pattern, whereupon said state machine changes state to advance to the next positive reference pattern test, and wherein the program tables for at least some of the state machines provide for comparing received bit strings with at least one selected negative reference pattern, and wherein each program table causes its respective state machine to reset to an initial machine state when the received bit string compares favorably with said at least one selected negative reference pattern for that state thereby protecting against a stalled state by establishing a maximum time within which a character will be identified, or upon failure of a predetermined number of sequentially received bit strings to compare favorably with the respective positive reference pattern, and wherein the character will be identified in response to one of said state machines reaching and comparing favorably with the last of its positive reference pattern tests in the sequence.

4,876,731

NEURAL NETWORK MODEL IN PATTERN RECOGNITION USING PROBABILISTIC CONTEXTUAL INFORMATION

Keith Loris, Brooklyn, and James Euchner, Bedford, both of N.Y., assignors to Nynex Corporation, New York, N.Y.

Filed Feb. 19, 1988, Ser. No. 158,215
Int. Cl.[4] G06K *9/62*
U.S. Cl. 382—40 **32 Claims**

1. A system for recognizing an unknown pattern, said unknown pattern including one or more symbols which are part of a pattern system which is devoid of inherent context, comprising:

storing means for storing artificial contextual information associated with said unknown pattern and based upon other than information as to symbol features and the pattern system; and

recognizer means responsive to said known pattern and to said artificial contextual information, said recognizer means having a processing phase wherein said recognizer means processes at least one symbol of said unknown pattern and outputs as a recognition decision that said one symbol is one of a plurality of category names and wherein in reaching said recognition decision during said processing phase utilizes said artificial contextual information.

4,876,732

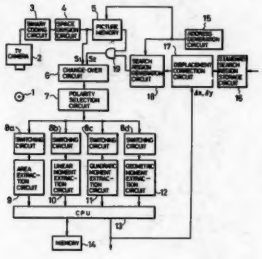
SYSTEM FOR DETECTING ROTATIONAL ANGLE OF OBJECTIVE PATTERN

Michiaki Miyagawa; Yutaka Ishizaka, and Shoji Shimomura, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed May 18, 1987, Ser. No. 50,578
Claims priority, application Japan, Jun. 4, 1986, 61-128032
Int. Cl.[4] G06K *9/36*
U.S. Cl. 382—41 **4 Claims**

1. A method for detecting a rotational angle of an objective pattern comprising the steps of:

(a) optically sensing an objective pattern by a picture sensor to form a sense signal;
(b) binary coding said sense signal into picture elements;
(c) calculating an area of said objective pattern and a plurality of linear moments of said objective pattern from said picture elements;
(d) calculating a center of gravity of said objective pattern from said area and said linear moments;
(e) storing said area, linear moments, center of gravity and said binary-coded picture elements into a memory;
(f) calculating a displacement of said center of gravity corresponding to a difference between a center of gravity of a predetermined picture sample and said center of gravity of said objective pattern;



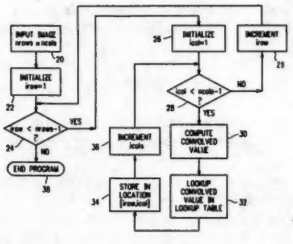
(g) determining an appropriate search region from among said binary-coded picture elements and reading out data corresponding to said search region;
(h) normalizing a position of said search region;
(i) calculating a rotational angle for said objective pattern based on predetermined mathematical formulae and utilizing said stored information; and
(j) storing predetermined data for determining whether said logic state of said picture information is to be inverted, and as to which one of said methods of calculation are to be used in detection of said rotational angle of said objective pattern.

4,876,733

METHOD FOR PERFORMING MORPHIC TRANSFORMATIONS ON IMAGE DATA IN A GENERAL PURPOSE COMPUTER

Mark A. Lavin, Mount Kisco, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.J

Continuation-in-part of Ser. No. 925,333, Oct. 31, 1986, abandoned. This application Mar. 7, 1989, Ser. No. 320,824
Int. Cl.[4] G06K 9/36
U.S. Cl. 382—27 **7 Claims**



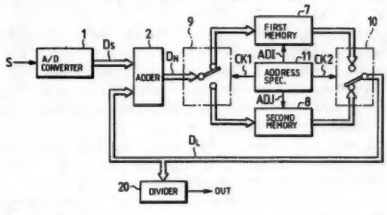
1. A method for use in a general purpose computer, for transforming an input image into an output image using a morphic transformation on image data comprised of pixels, said general purpose computer having a memory, said method comprising the steps of:
storing original pixels of said input image in said memory, said original pixels being addressed by at least first and second indexes;
mapping each of said original pixels in memory into an image of transformed pixels wherein each transformed pixel contains data representing an original pixel and neighboring pixels in a predefined neighborhood wherein, said mapping comprises;
accumulating said original pixels accessed according to said first index to provide first accumulated values and storing said first accumulated values in said memory;
shifting said first accumulated value stored in said memory by two and replacing said first accumulated value stored in said memory with said value shifted by two to provide a first replaced accumulated value;
ORing said value of said original pixel with said first replaced accumulated value to provide a first
ORred accumulated value and replacing said first accumulated value with said first ORred accumulated value in said memory;
accumulating said original pixels accessed according to said second index to provide second accumulated values and storing said second accumulated values in said memory;
shifting said second accumulated values a second predetermined number of bits to provide a shifted second accumulated value; and
ORing said first ORred accumulated value in said memory to said second accumulated value to provide a second added accumulated value and replacing said value in said memory with said second added accumulated value;
searching a lookup table using said second added accumulated value as an index and storing a value pointed to in said lookup table by said index in an output array in said memory; and
repeating said steps of mapping and searching for each of said original pixels; and
providing an output image having pixels corresponding to values in said output array, thereby requiring only four accesses to said memory to determine said morphic transformation.

4,876,734

IMAGE SIGNAL PROCESSING METHOD AND APPARATUS

Kazushige Kawamura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 25, 1988, Ser. No. 198,272
Claims priority, application Japan, May 25, 1987, 62-125679
Int. Cl.[4] G06K 9/44
U.S. Cl. 382—54 **7 Claims**



1. An image signal processing apparatus in which first picture element data for one image are added to second picture element data for a second image in accordance with the data arrangement thereof to provide addition data, and said addition data are averaged to provide averaged data for use in image reproduction; comprising:

first memory means having memory regions a given number, less than all, of said elements of said first picture element data, an initial empty memory region for storing at least one picture element;

second memory means having memory regions for storing the remaining first picture element data;

control means for repeatedly performing:

(1) a first operation in which one of said second picture elements is added to a picture element read out from said second memory means, data provided as a result of said addition is stored in said empty region of said first memory means, and the memory region of said second memory means thus read out is designated as the next empty memory region, and

(2) a second operation in which the next picture element of said second picture element data is added to a picture element read out from said first memory means, data provided as a result of said addition is stored in said next empty memory region in said second memory means, and the memory region of said first memory means thus read out is selected as the next empty memory region; and

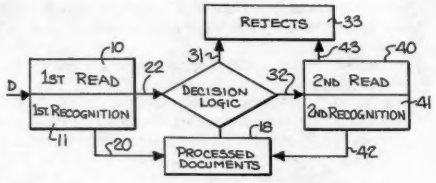
means for dividing said addition data by the number of addition operations, to provide said averaged data.

4,876,735

METHOD AND APPARATUS FOR CHARACTER RECOGNITION SYSTEMS

William C. Martin, and Gene D. Rohrer, both of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 18, 1987, Ser. No. 134,729
Int. Cl.[4] G06K 9/00
U.S. Cl. 382—57 **10 Claims**



1. A document reading machine comprising

a first character reading system mounted for reading characters on documents;

a second character reading system also mounted for reading said characters on said documents;

first character recognition logic for recognizing characters read by first system and generating a reject character when a character cannot be recognized, said first logic periodically creating a first undetected error by recognizing a character when a reject character should have been generated;

second character recognition logic for recognizing characters read by said second system and generating said reject character when a character cannot be recognized, said second logic periodically creating a second undetected error by recognizing a character when said reject character should have been generated;

decision logic for choosing one of: a character recognized by said first logic, said reject character, and a character recognized by said second logic, as the character most accurately representing a character on said document; and said decision logic including means for substantially randomly choosing with a probability of p, said character generated by said second logic when said first logic generates said reject character, where p is a probability having a value from 0 to 1; and

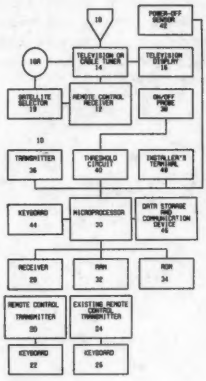
means for adjustably setting the value within the range said probability p within the range of from 0 to 1.

4,876,736

METHOD AND APPARATUS FOR DETERMINING CHANNEL RECEPTION OF A RECEIVER

David A. Kiewit, Palm Harbor, Fla., assignor to A. C. Nielsen Company, Northbrook, Ill.

Filed Sep. 23, 1987, Ser. No. 100,198
Int. Cl.[4] H04B 17/00
U.S. Cl. 455—2 **38 Claims**



1. Apparatus for identifying the channel to which a remotely controlled receiver is tuned comprising:

first wireless transmitter means for receiving a plurality of viewer entered selections and for transmitting a first unique predetermined control signal for each of said viewer entered selections;

receiver means for receiving said transmitted first predetermined control signals;

processor means coupled to said receiver means for processing said first received predetermined control signals, said processor means including means for identifying said viewer entered selection, and means for generating a second unique predetermined control signal representative of said identified viewer entered selection; and

second wireless transmitter means coupled to said processor means for receiving said generated second predetermined control signal and transmitting a representation thereof to said remotely controlled receiver to thereby tune the receiver.

4,876,737

SATELLITE DATA TRANSMISSION AND RECEIVING STATION

Donald J. Woodworth; Frank A. Ziegler, and James B. Grabenstein, all of Ocala, Fla., assignors to Microdyne Corporation, Ocala, Fla.

Filed Nov. 26, 1986, Ser. No. 935,197
Int. Cl.[4] H04B 7/14
U.S. Cl. 455—12 **11 Claims**

1. A satellite data transmitting and receiving system comprising, a data transmission station having a data transmission modem,

means at said modem for phase modulating data onto an intermediate frequency signal,

a source of an identification signal providing a signal indicative solely of a specific channel on a specific satellite,

means for periodically phase modulating said identification signal onto the intermediate frequency signal,

means for modulating said intermediate frequency signal onto a subcarrier frequency signal,

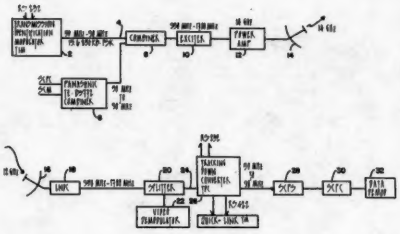
means for modulating said subcarrier signal onto a radio frequency signal,

a receiving station having a receiver

means for transmitting the radio frequency signal from said data transmission station to said receiving station via a satellite,

said last mentioned means transmitting in one of the available satellite transmission bands, said receiving station comprising

downconverter means at the receiving station for generating



a local oscillator frequency to recover the subcarrier frequency from the radio frequency signal.

a mixer,

a voltage controlled oscillator means at the receiving station for generating a local oscillator frequency for application to said mixer to retrieve at the output of said mixer the intermediate frequency signal,

means for retrieving said ID signal from said intermediate frequency signal and

means for recovering said phase modulated data in response to recovery of the ID signal generated by said source.

4,876,738

MOBILE RADIO TRANSMISSION SYSTEM

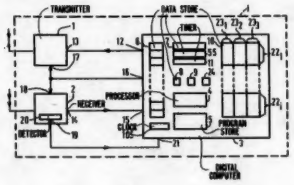
Geoffrey R. Selby, Banstead, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 16, 1987, Ser. No. 98,443

Claims priority, application United Kingdom, Sep. 18, 1986, 8622506

Int. Cl.[4] H04B *1/00;* H04Q *7/00*

U.S. Cl. 455—33 **15 Claims**



1. A mobile radio transmission system comprising:

a plurality of receiving and transmitting base stations situated at respective geographic locations, defining a plurality of respective service areas;

a plurality of mobile stations, each including means for transmitting a registration identification and communicating by two-way radio with each base station when in communication range of that base station; and

control means including a station location record store corresponding to each mobile station, for storing a respective service area identity responsive to receipt at a base station of a registration identification transmitted by the corresponding mobile station,

characterized in that each mobile station comprises

means for storing a mobile location record capable of storing at least n service area identities, where $n > 1$,

means for determining if the number of service area identities currently stored in that mobile location record equals n,

means for sensing when that mobile station is not within communication range of any base station serving a service area whose identity is currently stored in that mobile location record,

means responsive to said means for sensing, when that mobile station is not within such range, for attempting to communicate with another base station having another service area identity, which may be within range; and upon communicating with said another base station, for replacing a service area identity already stored in said mobile location record with said another service area identity if n service area identities were already stored in said mobile location record, and otherwise storing said another service area identity in said mobile location record, and said control means further comprises

means for storing n different service area identities in each location record, responsive to receipt of registration identification signals by respective base stations from respective mobile stations, and

means for responding to such communicating with said another base station by updating the contents of the station location record for the corresponding mobile station such that the corresponding mobile station is recorded as being currently located in said another service area; and for replacing a service area identity already stored in said station location record with said another service area identity if n service area identities were already stored in said station location record, and otherwise storing said another service area identity in said station location record while retaining the service area identities already stored.

4,876,739

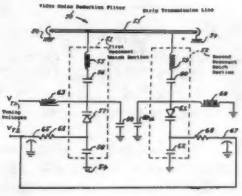
TVRO RECEIVER SYSTEM WITH LOW-COST VIDEO-NOISE REDUCTION FILTER

John Y. Ma, Milpitas, and Albert C. Houston, Santa Cruz, both of Calif., assignors to Capetronic (BSR) Ltd., Kowloon, Hong Kong

Continuation of Ser. No. 792,767, Oct. 30, 1985, Pat. No. 4,718,117. This application Dec. 31, 1987, Ser. No. 140,037

Int. Cl.[4] H04B *1/10*

U.S. Cl. 455—266 **8 Claims**



1. A TVRO receiver for receiving frequency modulated video signals centered within a frequency range having a nominal center frequency, the receiver comprising:

a tuner including a superheterodyne circuit having a voltage-controlled oscillator (VCO) , means for supplying a controlling input voltage to said VCO , and a mixer for combining incoming 1st IF signals within a predetermined IF frequency range with the output of said VCO to reduce the frequency of the 1st IF signal to within a 2nd IF frequency range having a predetermined nominal center frequency which permits the output frequencies of said

VCO to be substantially non-interfering with the frequency range of the 1st IF signals, thereby preventing the output of the VCO from interfering with the 1st IF signals, and

linear phase passband filter means for passing a single video channel in the second IF input from said mixer, said filter means having characteristics with a peak at the center of the filter passband and having sharply sloping passband edges on either side thereof, so as the essentialy pass only those signals in the 2nd IF output from said mixer which are centered about the center of said filter passband.

4,876,740

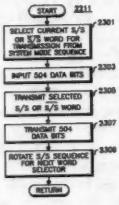
RADIOTELEPHONE SYSTEM EMPLOYING DIGITIZED SPEECH/DATA SIGNALLING

Stephen N. Levine, and Albert J. Leitich, both of Chicago, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 905,369, Sep. 8, 1986, abandoned, which is a division of Ser. No. 771,460, Aug. 30, 1985, abandoned. This application Feb. 13, 1989, Ser. No. 310,013

Int. Cl.[4] H04Q *7/04*

U.S. Cl. 455—33 **19 Claims**



12. A digital message transmitter for a cellular radiotelephone system having at least two modes of operation, said transmitter comprising:

means for generating one of a plurality of high auto correlation, low cross correlation multiple bit data words and its logical inverse whereby the transmitter may be identified;

means for generating a pattern of one of a predetermined sequence of said generated multiple bit data word and said logical inverse whereby a mode of operation may be specified;

means for interleaving said generated pattern with a predetermined number of bits of the digital message; and

means for modulating said interleaved pattern and message on a radio carrier.

4,876,741

METHOD OF RECEIVING A COMPRESSED COMPOSITE SIGNAL

Paul H. Jacobs, Fairport, N.Y., and Douglas P. Collette, Raleigh, N.C., assignors to General Signal Corporation, Stamford, Conn.

Division of Ser. No. 807,641, Dec. 11, 1985, Pat. No. 4,718,116, which is a continuation-in-part of Ser. No. 558,046, Jan. 26, 1984, Pat. No. 4,573,208, which is a division of Ser. No. 348,148, Jun. 1, 1982, Pat. No. 4,539,707. This application Aug. 21, 1987, Ser. No. 87,914

Int. Cl.[4] H04B *1/16, 1/48*

U.S. Cl. 455—47 **16 Claims**

1. A two-way, land mobile, single sideband, radio communication system comprising:

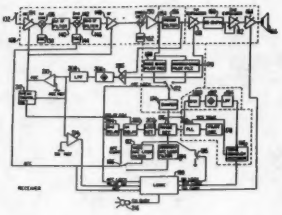
a push-to-talk transmitter for broadcasting a compressed signal, said compressed signal including an unattenuated frequency modulated pilot tone during an initial predetermined time interval and thereafter a composite signal including an attentuated frequency modulated pilot tone and an audio signal, said transmitter including means operative only during said initial predetermined time interval for adjusting said transmitter to produce full rated power; and

a receiver for receiving said broadcast signal, said receiver including:

means for detecting said compressed composite signal,

pilot tone filter means for separating the pilot tone from said compressed signal,

phase lock loop means responsive to said pilot tone filter means for (a) varying the filter characteristics of said pilot tone filter to thereby enhance the acquisition of



said detected compressed composite signal, (b) varying the filter characteristics of said phase lock loop means after acquisition of said detected compressed composite signal to thereby enhance maintenance of lock-on of said detected compressed composite signal,

audio signal filter means for separating said audio signal from said compressed composite signal, and

means responsive to said pilot filter means for expanding and amplifying said compressed audio signal without expanding and amplifying said pilot tone.

4,876,742

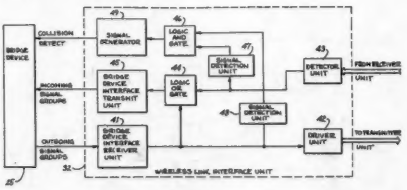
APPARATUS AND METHOD FOR PROVIDING A WIRELESS LINK BETWEEN TWO LOCAL AREA NETWORK SYSTEMS

Gary Vacon, 52 Mill St., Woburn, Mass. 01801, and James J. Liu, 34 Wadsworth Rd., Sudbury, Mass. 01776

Filed Mar. 23, 1987, Ser. No. 29,214

Int. Cl.[4] H04B *7/00*

U.S. Cl. 455—66 **8 Claims**



1. Apparatus for exchanging signal groups between two local area networks, wherein said signal groups are exchanged through a wireless medium, said apparatus comprising:

a first and a second transmitter/receiver unit for transmitting and detecting radiation propagated across said wireless medium, said first and said second transmitter/receiver units exchanging signal groups therebetween;

a first and a second local area network each including a local bus and local processing components coupled to said local bus, said local processing components applying signals to and receiving signals from said local bus;

a first bridge circuit coupled to said first transmitter/-receiver unit and to a first local bus of said first local area network for transferring signal groups therebetween, said first bridge circuit identifying first signal groups on said

first local bus to be applied to a processing component of said second local area network and applying said first signal groups to said first transmitter/receiver unit for transmission to said second transmitter/receiver unit; and

a second bridge circuit coupled to said second transmitter/-receiver unit and a second local bus of said second local area network for transferring signal groups therebetween, said second bridge identifying second signal groups on said second local bus to be applied to a processing component in said first local area network and applying said second signal groups to said second transmitter/receiver unit for transmission to said first transmitter/receiver unit, wherein said first and said second bridge circuits include apparatus for identifying simultaneous transfer of a first signal group and a second signal group therethrough, an identification of a simultaneous transfer causing a reapplication of said first signal group participating in said simultaneous transfer to said first transmitter/receiver unit and a reapplication of said second signal group participating in said simultaneous transfer to said second transmitter/-receiver unit.

4,876,743

SIGNAL DIVERSITY ARRANGEMENT FOR MOBILE RECEPTION

Karl-Heinz G. Lindenmeier, Planegg, and Gerhard Flachenecker, Ottobrunn, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 1, 1987, Ser. No. 127,827

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1986, 3641109

Int. Cl.[4] H04B *11/16*

U.S. Cl. 455—133 **12 Claims**

1. A signal diversity receiving system comprising a receiver and a diversity processor,

said processor comprising means for applying a selected one of a plurality of input signals to said receiver, and means for applying a different one of said input signals to said receiver after a switching interval, in case of interference affecting said selected one,

characterized in that said means for applying a different one comprises an interference detector operating in an analog mode, and a comparator having first and second inputs, said interference detector having an output connected to said first input,

further comprising means for applying a set value to said second input, said comparator having a binary signal output indicative of interference when said output of said interference detector exceeds said set value,

at least one integrator having a discharging time constant,

means for deriving a signal from said interference detector output and applying that signal to said at least one integrator, said at least one integrator having a time of integration equal to said switching interval, and

means for adding said integrator output signal to one of said comparator inputs for varying a relationship between a magnitude of the interference detector output and said set value when the interference signal increases.

4,876,744

MIXER WITH RAT RACE CIRCUIT

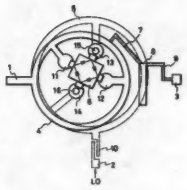
Haruyoshi Endo, Zama; Kouei Misaizu, Kawasaki, and Mitsuo Makimoto, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 15, 1988, Ser. No. 144,156

Claims priority, application Japan, Jan. 16, 1987, 62-8489; Aug. 7, 1987, 62-198529

Int. Cl.[4] H04B *1/26*

U.S. Cl. 455—326 **8 Claims**



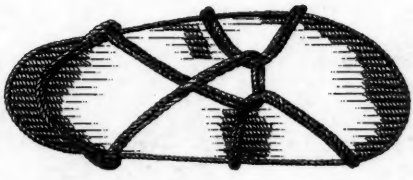
1. A mixer including a balanced-to-unbalanced conversion circuit and a bridge-coupled diode circuit, coupled to said balanced-to-unbalanced conversion circuit, for outputting an intermediate frequency signal as the result of mixing of a radio frequency signal and a local oscillator signal which are inputted into said mixer, said balanced-to-unbalanced conversion circuit being constructed of first and second rat race circuits, one being for said radio frequency signal and comprising a first ring-shaped conductive line and the other being for said local oscillator signal and comprising a second ring-shaped conductive line, said mixer comprising substrate means having first and second surfaces, said first ring-shaped conductive line of said first rat race circuit being formed as a pattern on said first surface of said substrate and said second ring-shaped conductive line of said second rat race circuit being formed as a pattern on said second surface, said bridge-coupled diode circuit comprising four diodes so as to mix said radio frequency signal and said local oscillator signal to produce a signal with a frequency between frequencies of the radio frequency signal and said local oscillator signal and being positioned within said first ring-shaped line on said first surface thereof.

DESIGNS

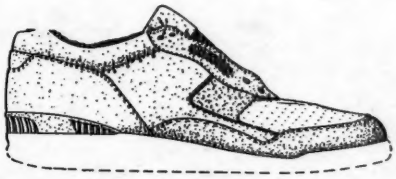
OCTOBER 24, 1989

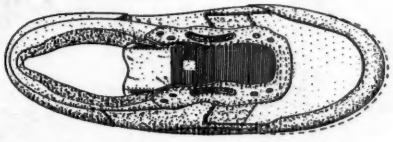
304,125
BOOT FOR A MOTORCYCLIST
Hisashi Kushitani, No. 9-14,4-chome, Yoga, Setagaya-ku Tokyo, Japan
Filed Dec. 31, 1986, Ser. No. 948,283
Term of patent 14 years
U.S. Cl. D2—275

304,126
SANDAL
Kristy L. Christian; Fred A. Ridley, Jr., both of 7908 Lakehurst Dr., and Clay K. Ridley, 2916 Lansdowne, all of Oklahoma City, Okla. 73120
Filed Jul. 23, 1987, Ser. No. 77,534
Term of patent 14 years
U.S. Cl. D2—293

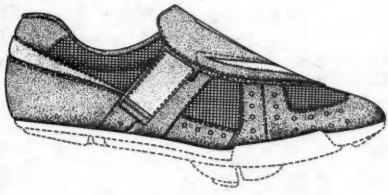


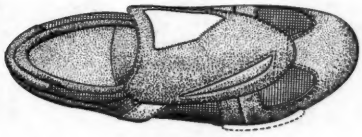
304,127
SHOE UPPER
Miza Mourad, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Aug. 22, 1988, Ser. No. 234,829
Term of patent 14 years
U.S. Cl. D2—314





304,128
SHOE UPPER
Kenneth R. Kolman, Lake Oswego; Michael J. Nyberg; Richard W. Cote, both of Tualatin, all of Oreg.; Rory W. Fuerst, Menlo Park, Calif., and James Granville, San Antonio, Tex., assignors to Avia Group International, Inc., Portland, Oreg.
Filed Nov. 3, 1988, Ser. No. 266,497
Term of patent 14 years
U.S. Cl. D2—314

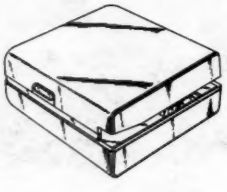




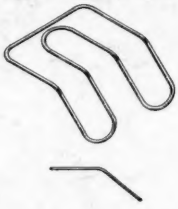
304,129
HOLDER FOR FLOSS AND SIMILAR ARTICLES
Vonda J. Thorpe, 1220 W. 4575 North, Brigham City, Utah 84302
Filed Feb. 24, 1986, Ser. No. 834,863
Term of patent 14 years
U.S. Cl. D3—23

304,130
ATTACHABLE KEY LIGHT
Chang J. Song, 6751 Mang Road, Richmond, B.C., Canada V7C 2Y1
Filed Feb. 12, 1987, Ser. No. 13,821
Term of patent 14 years
U.S. Cl. D3—63

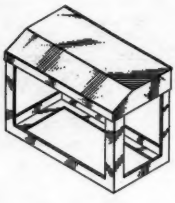
304,131
ENVELOPE OPENER
Shintaro Tanigami, Tokyo, Japan, assignor to Elm Industry Co., Ltd., Tokyo, Japan
Filed May 25, 1988, Ser. No. 198,383
Term of patent 14 years
U.S. Cl. D3—72



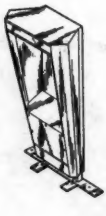
304,132
BELT MOUNTED CLIP BOARD HOLDER
Richard A. Jackson, 114 Garvins Falls Rd., Concord, N.H. 03301
Filed Jun. 12, 1986, Ser. No. 874,345
Term of patent 14 years
U.S. Cl. D3—100



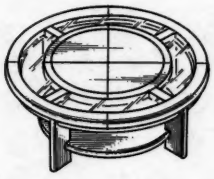
304,133
GAS CAN RACK
Michael D. Casselman, 16981 Krameria, Riverside, Calif. 92504
Filed Mar. 30, 1987, Ser. No. 31,120
Term of patent 14 years
U.S. Cl. D6—420



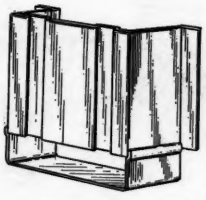
304,134
TELEPHONE SHELTER
Thomas R. Griffiths, Lambs Lane, Rainham Essex RM13 7RT, England
Filed Jan. 28, 1987, Ser. No. 8,408
Claims priority, application United Kingdom, Jul. 28, 1986, 1035685
Term of patent 14 years
U.S. Cl. D6—421



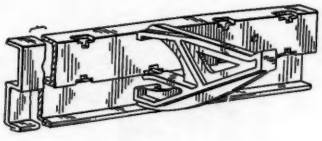
304,135
TABLE
George Mergenov, Longwood, Fla., assignor to Lune-Ching Hu, Paramount, Calif.
Filed Nov. 20, 1986, Ser. No. 933,603
Term of patent 14 years
U.S. Cl. D6—477



304,136
PLASTIC BAG DISPENSER
John J. Severini, 2911 Severini La., Castro Valley, Calif. 94546
Filed May 26, 1987, Ser. No. 54,240
Term of patent 14 years
U.S. Cl. D6—515

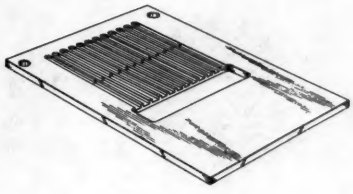


304,137
IMPLEMENT HOLDER
Milton E. Handler, Northbrook, and Michael Peterson, Evanston, both of Ill., assignors to Hirsh Company, Skokie, Ill.
Filed Jun. 11, 1987, Ser. No. 61,142
Term of patent 14 years
U.S. Cl. D6—569



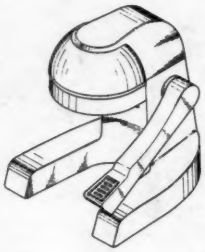
304,138
SUGAR POT
Johannes H. Weernink, Goor, Netherlands, assignor to Mepal B.V., Lochem, Netherlands
Filed May 7, 1987, Ser. No. 46,862
Claims priority, application World Int. Prop. O., Nov. 27, 1986, DM007,846
Term of patent 14 years
U.S. Cl. D7—17

304,139
MOLD PLATE ADAPTER
Bernard Miles, 119 Trenton Ave., Point Pleasant Beach, N.J. 08742
Filed Aug. 20, 1985, Ser. No. 767,373
Term of patent 14 years
U.S. Cl. D7—43



304,140
JUICE PRESSER OR SIMILAR ARTICLE
Yung-To Li, No. 58, Jen-Ai St., Eng-Hang Tsun, Yung-Kang Hsiang, Tainan Hsien, Taiwan
Filed May 19, 1987, Ser. No. 51,812
Claims priority, application Taiwan, Feb. 28, 1987, 76301131
Term of patent 14 years
U.S. Cl. D7—49

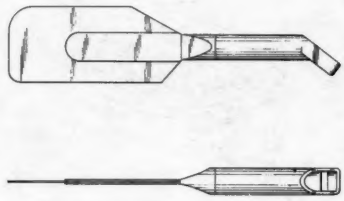
304,141
JUICE PRESSER OR SIMILAR ARTICLE
Yung-To Li, No. 58, Jen-Ai St., Eng-Hang Tsun, Yung-Kang Hsiang, Tainan Hsien, Taiwan
Filed May 19, 1987, Ser. No. 51,813
Claims priority, application Taiwan, Mar. 3, 1987, 76301191
Term of patent 14 years
U.S. Cl. D7—49



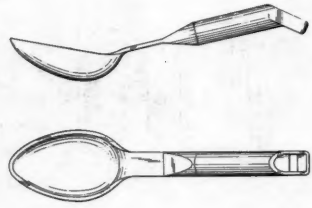
304,142
CONDIMENT MILL
William E. Bounds, P.O. Box 1547, Torrance, Calif. 90505
Filed May 30, 1986, Ser. No. 869,023
Term of patent 14 years
U.S. Cl. D7—53

304,143
SOFT DRINK CARRIER
William M. Dennis, 9421 Steel, Detroit, Mich. 48228
Filed Feb. 6, 1986, Ser. No. 826,889
Term of patent 14 years
U.S. Cl. D7—70

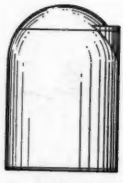
304,144
SPATULA
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Nov. 19, 1986, Ser. No. 932,899
Claims priority, application Italy, May 23, 1986, 21970/86[U]
Term of patent 14 years
U.S. Cl. D7—102



304,145
SPOON
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Nov. 19, 1986, Ser. No. 932,898
Claims priority, application Italy, May 23, 1986, 21970/86[U]
Term of patent 14 years
U.S. Cl. D7—104



304,146
MILK CAN
Johannes H. Weernink, PG Goor, Netherlands, assignor to MEPAL B.V., Lochem, Netherlands
Filed May 7, 1987, Ser. No. 46,774
Claims priority, application World Int. Prop. O., Nov. 27, 1986, DM 007,846
Term of patent 14 years
U.S. Cl. D7—317



304,147

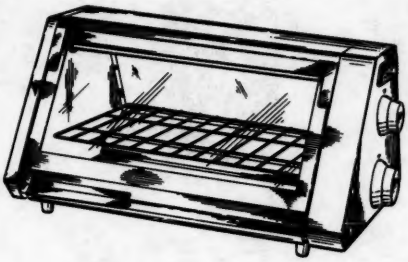
ELECTRIC OVEN TOASTER

Kazuo Takada, Nara; Yayoi Ogata, Hyogo, and Naomi Nakajima, Kyoto, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Dec. 30, 1986, Ser. No. 947,967

Term of patent 14 years

U.S. Cl. D7—350



304,148

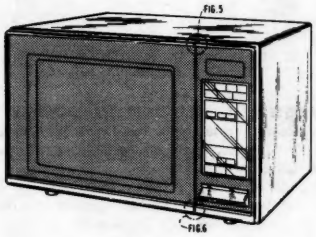
MICROWAVE OVEN

Kensuke Mizuma; Masayoshi Kubo; Hisayoshi Matoba, and Masuo Ichihara, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 30, 1986, Ser. No. 869,070

Term of patent 14 years

U.S. Cl. D7—351



304,149

MICROWAVE OVEN

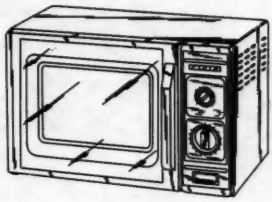
Hideo Nishikawa; Keazo Okamoto, both of Osaka, and Fumihiko Kitada, Neyakawashi, all of Japan, assignors to Imanishi Kinzoku Kogyo Kabushiki Kaisha, Osaka, Japan

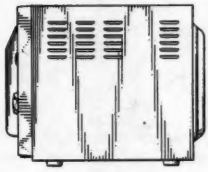
Filed Jun. 10, 1986, Ser. No. 873,208

Claims priority, application Japan, Feb. 27, 1986, 61-6612

Term of patent 14 years

U.S. Cl. D7—351





304,150

MICROWAVE OVEN

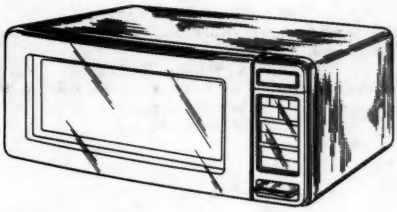
Masayoshi Kubo, Nara; Katsutoshi Kido, Kyoto; Masuo Ichihara, Nara; Kensuke Mizuma, Nara, and Hisayoshi Matoba, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

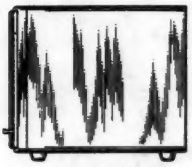
Filed Jun. 22, 1987, Ser. No. 64,494

Claims priority, application Japan, Mar. 20, 1987, 62-10575

Term of patent 14 years

U.S. Cl. D7—351

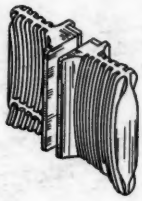




304,151
REFILLABLE PROPANE TORCH
David S. Chapin, Raleigh, N.C., and Gilbert R. Farnham, Sycamore, Ill., assignors to Cooper Industries, Inc., Houston, Tex.
Filed May 1, 1986, Ser. No. 858,519
Term of patent 14 years
U.S. Cl. D8—30

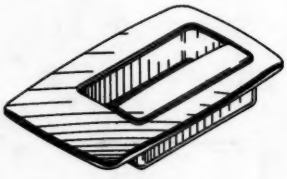
304,152
CORDLESS SCREWDRIVER
David G. Kmetz, Westborough, Mass., assignor to The Stanley Works, New Britain, Conn.
Filed Oct. 19, 1987, Ser. No. 110,484
The portion of the term of this patent subsequent to Jul. 4, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—68

304,153
HAND HELD KNIFE SHARPENER
James R. Reichow, Brooklyn Park, Minn., assignor to Normark Corporation, Minneapolis, Minn.
Filed May 12, 1986, Ser. No. 862,566
Term of patent 14 years
U.S. Cl. D8—93



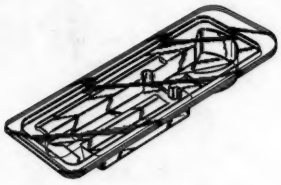
304,154
FOLDABLE KNIFE
Ralph F. Osterhout, San Francisco, Calif., assignor to Tekna, Redwood City, Calif.
Filed Mar. 9, 1987, Ser. No. 24,102
Term of patent 14 years
U.S. Cl. D8—99

304,155
FLUSH MOUNTED LATCH ASSEMBLY
Richard H. Russell, Farmington, and David W. Kaiser, North Haven, both of Conn., assignors to The Eastern Company, Cleveland, Ohio
Filed Jul. 10, 1987, Ser. No. 72,276
The portion of the term of this patent subsequent to Sep. 26, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—303

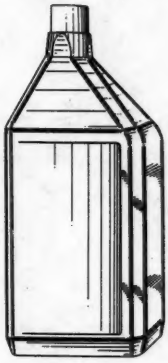


304,156
COVERED SLIDING GLASS DOOR HANDLE
Ben A. Puente, Jr., 3800 Kings Way, Sacramento, Calif. 95821
Continuation-in-part of Ser. No. 728,693, Apr. 29, 1985, abandoned. This application Nov. 22, 1988, Ser. No. 274,993
Term of patent 14 years
U.S. Cl. D8—314

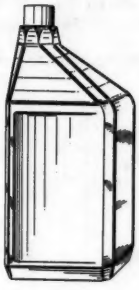
304,157
PACKAGE FOR DENTAL PRODUCTS
Robert D. Holewinski, Lakehurst, N.J., assignor to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.
Filed Nov. 24, 1986, Ser. No. 934,535
Term of patent 14 years
U.S. Cl. D9—347



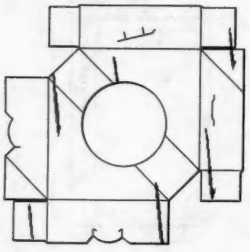
304,158
BOTTLE
York Kleinert, Middlesex, N.J., assignor to Alloy Tool and Mold, Mfg., Corp. (ATM), North Branch, N.J.
Filed Jan. 31, 1986, Ser. No. 824,771
Term of patent 14 years
U.S. Cl. D9—375



304,159
BOTTLE
York Kleinert, Middlesex, N.J., assignor to Alloy Tool and Mold, Mfg., Corp. (ATM), North Branch, N.J.
Filed Jan. 31, 1986, Ser. No. 824,772
Term of patent 14 years
U.S. Cl. D9—375



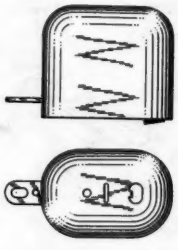
304,160
CARTON BLANK
Neil V. H. Goldman, London, England, assignor to Frank Coleman (Luton) Limited, Flitwick, England
Filed Jan. 16, 1987, Ser. No. 3,923
Claims priority, application United Kingdom, Jul. 25, 1986, 1035642
Term of patent 14 years
U.S. Cl. D9—433



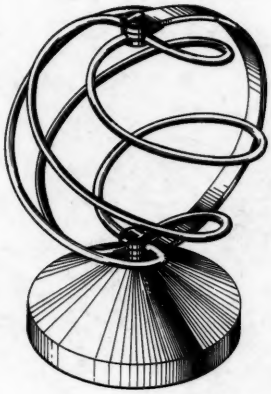
304,161
TALKING CLOCK
Hidekatsu Nomizu, Yoshida, Japan, assignor to Twin Bird Industrial Company, Limited, Niigata, Japan
Filed Nov. 10, 1986, Ser. No. 929,237
Claims priority, application United Kingdom, May 12, 1986, 1034024
Term of patent 14 years
U.S. Cl. D10—21

304,162
COMPUTER CONTROLLED TIME CLOCK WITH FOLD-UP KEYBOARD
Durward W. Calkins, Cincinnati, Ohio, assignor to Cincinnati Time, Inc., Cincinnati, Ohio
Filed Sep. 26, 1986, Ser. No. 913,221
Term of patent 14 years
U.S. Cl. D10—41

304,163
ELECTROMAGNETIC BELL
Junichi Aizawa; Shoichiro Kumazawa; Satoru Yamauchi, and Isao Kondo, all of Tokyo, Japan, assignors to Seikosha Co., Ltd., Japan
Filed Dec. 11, 1986, Ser. No. 940,646
Claims priority, application Japan, Jul. 17, 1986, 61-28011
Term of patent 14 years
U.S. Cl. D10—116

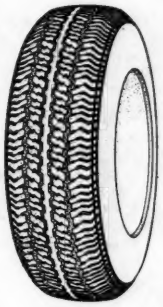


304,164
GEOMETRIC ORNAMENT
Randall S. Rochte, 5 Concord Green #6, Concord, Me. 01742
Filed Apr. 14, 1986, Ser. No. 851,688
Term of patent 14 years
U.S. Cl. D11—131

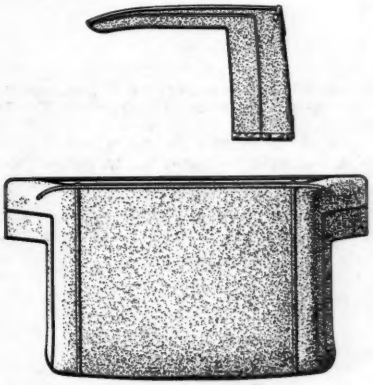


304,165
NECKTIE CLASP
Keith A. Mosley, 439 Shannon Dr., Atlanta, Ga. 30310
Filed Sep. 4, 1985, Ser. No. 772,723
Term of patent 14 years
U.S. Cl. D11—202

304,166
TIRE
Maurice Graas, Luxembourg City, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jun. 16, 1986, Ser. No. 875,778
Claims priority, application Brunei, Jan. 13, 1986, 60794-00
The portion of the term of this patent subsequent to Jun. 16, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—143

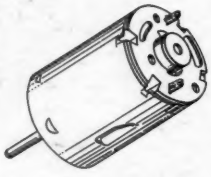


304,167
DECORATIVE TOP ADAPTED TO BE PLACED OVER THE EXISTING ROOF OF A TRUCK
David D. Eash, and Richard Hannas, both of Columbia, Md., assignors to E&G Classics, Inc., Columbia, Md.
Filed Nov. 4, 1988, Ser. No. 267,008
Term of patent 14 years
U.S. Cl. D12—156

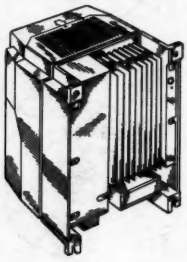


304,168
SUPPORT BRACKET FOR HOLDING LOAD LOCKS WHEN NOT IN USE FOR MOUNTING ON A BEAM BEHIND THE CAB OF A TRUCK VEHICLE
Marvin E. Gurganus, 2129 Holcomb Rd., Dalton, Ga. 30720
Filed Jan. 12, 1987, Ser. No. 2,429
Term of patent 14 years
U.S. Cl. D12—157

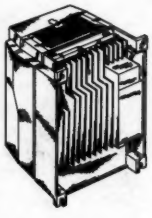
304,169
ELECTRIC MOTOR
Michio Hoshino; Masakazu Ikegami, and Hajime Sato, all of Matsudo, Japan, assignors to Mabuchi Motor Co., Ltd., Japan
Filed Mar. 10, 1986, Ser. No. 842,401
Claims priority, application Japan, Sep. 12, 1985, 60-38602
Term of patent 14 years
U.S. Cl. D13—1



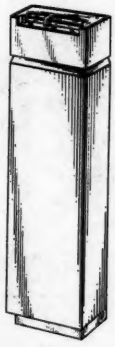
304,170
POWER INVERTER
Nobuyuki Kondo; Yoshinori Abe, both of Kamakura; Hideaki Tata, Nagoya; Eiji Ito, Nagoya; Katsuhiko Chonan, Nagoya, and Hideo Iinuma, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Division of Ser. No. 743,703, Jun. 3, 1985. This application Sep. 21, 1988, Ser. No. 247,325
Claims priority, application Japan, Dec. 3, 1984, 59-49661; Dec. 3, 1984, 59-49665; Dec. 3, 1984, 59-49666; Dec. 3, 1984, 59-49667
Term of patent 14 years
U.S. Cl. D13—4



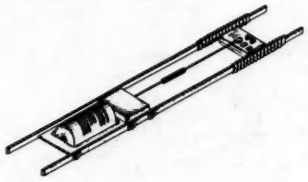
304,171
POWER INVERTER
Nobuyuki Kondo; Yoshinori Abe, both of Kamakura; Hideaki Tata, Nagoya; Eiji Ito, Nagoya; Katsuhiko Chonan, Nagoya, and Hideo Iinuma, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Division of Ser. No. 740,323, Jun. 3, 1985. This application Oct. 21, 1988, Ser. No. 260,891
Claims priority, application Japan, Dec. 3, 1984, 59-49660; Dec. 3, 1984, 59-49662; Dec. 3, 1984, 59-49663; Dec. 3, 1984, 59-49664
Term of patent 14 years
U.S. Cl. D13—4



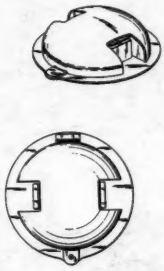
304,172
STORAGE BATTERY
Takashi Sogabe, Tokyo, and Kunio Takeyama, Kyoto, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Jul. 22, 1987, Ser. No. 76,262
Claims priority, application Japan, Jan. 30, 1987, 62-3646
Term of patent 14 years
U.S. Cl. D13—8



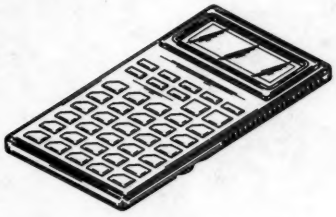
304,173
ELECTRICAL TRACK FOR A ROOM LIGHTING SYSTEM
Guido Frassati, Leumann; Giuseppe Muglialdo, Pino Torinese, and Riccardo Valvassori, Turin, all of Italy, assignors to S.A.M.E.S. S.p.A., Pinerolo, Italy
Filed Jan. 24, 1986, Ser. No. 822,267
Claims priority, application Italy, Jul. 24, 1985, 53625/85[U]
Term of patent 14 years
U.S. Cl. D13—13



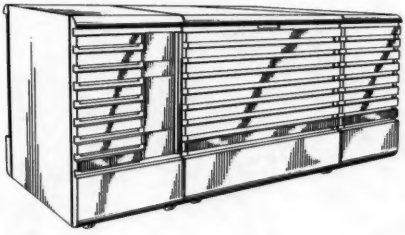
304,174
UTILITY RECEPTACLE COVER
William E. Giles, Garden Grove, and Joseph P. Kapp, Santa Ana, both of Calif., assignors to Trucker's Comfort Systems, Inc., Tustin, Calif.
Filed Jan. 31, 1986, Ser. No. 825,092
Term of patent 14 years
U.S. Cl. D13—31



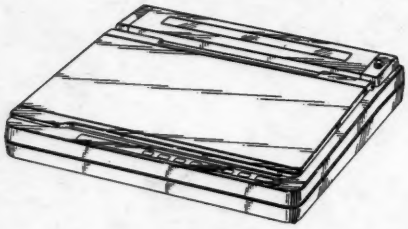
304,175
INPUT/OUTPUT TERMINAL
Hiroshi Sakaguchi, and Masaki Kawamura, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 26, 1986, Ser. No. 935,532
Claims priority, application Japan, May 29, 1986, 61-20952
Term of patent 14 years
U.S. Cl. D14—100



304,176
EXPANDABLE CENTRAL PROCESSING SYSTEM
Edward J. Cesarczyk, Watertown, and Richard R. Dillon, Wellesley, both of Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.
Filed May 29, 1986, Ser. No. 868,416
Term of patent 14 years
U.S. Cl. D14—102

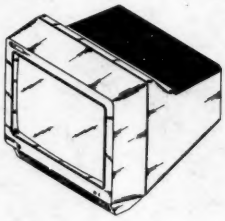


304,177
ELECTRONIC COPYING MACHINE
Kunio Hara, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 4, 1986, Ser. No. 903,435
Claims priority, application Japan, Mar. 12, 1986, 61-8541
Term of patent 14 years
U.S. Cl. D14—107

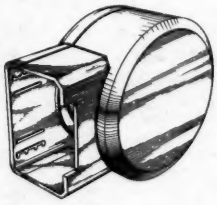


304,178
DISK DRIVE SHROUD ENCLOSURE FOR AN INDUSTRIAL COMPUTER
William V. Cranston, III; Randall W. Martin, both of Boca Raton; Mark S. Small, Pompano Beach, and Mark A. Young, Lake Worth, all of Fla., assignors to International Business Machines Corp., Armonk, N.Y.
Filed Sep. 25, 1986, Ser. No. 910,513
Term of patent 14 years
U.S. Cl. D14—109

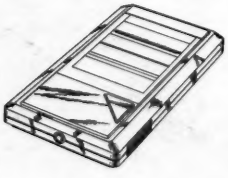
304,179
COMPUTER DISPLAY
Larry G. Beaton, Garner; Kevin T. McClain, Durham; Jonathan J. Vitello, Raleigh; Timothy D. Wetzel, Durham, and Roger C. Williams, Raleigh, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 18, 1986, Ser. No. 943,964
Term of patent 14 years
U.S. Cl. D14—113



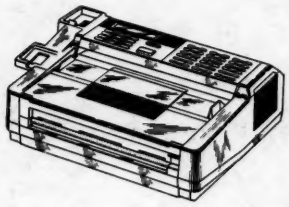
304,180
RETAINER FOR A COMPUTER MOUSE
Robert J. Gibson, Ten Piedmont Center, Ste. 302, Atlanta, Ga. 30305
Filed Jun. 10, 1987, Ser. No. 60,372
Term of patent 14 years
U.S. Cl. D14—114



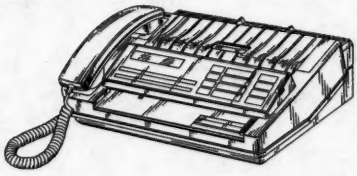
304,181
SCANNER FOR COMPUTER
Katsuji Kagayama; Yoshihiko Sugiyama, both of Nara, and Benito Mishiro, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Mar. 19, 1987, Ser. No. 28,160
Term of patent 14 years
U.S. Cl. D14—116



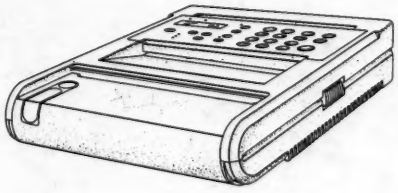
304,182
FACSIMILE
Masaki Takahashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 21, 1987, Ser. No. 6,093
Claims priority, application Japan, Jul. 22, 1986, 61-28684
Term of patent 14 years
U.S. Cl. D14—118



304,183
FACSIMILE
Kunio Hara, Chiba, and Shin-ichi Hiroki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed May 29, 1987, Ser. No. 55,742
Claims priority, application Japan, Dec. 8, 1986, 61-48253
Term of patent 14 years
U.S. Cl. D14—118

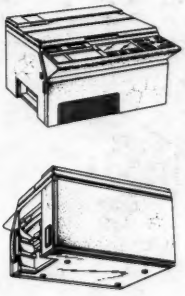


304,184
FACSIMILE TRANSMITTER/RECEIVER
Hiroaki Watanabe, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed May 29, 1987, Ser. No. 55,751
Claims priority, application Japan, Jan. 7, 1987, 62-000175
Term of patent 14 years
U.S. Cl. D14—118



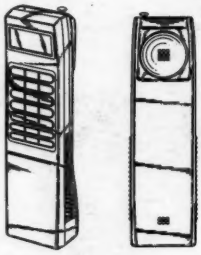
304,185
FACSIMILE
Tsutomu Yoshihara, Ayase, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 21, 1987, Ser. No. 5,874
Claims priority, application Japan, Jul. 24, 1986, 61-29142
Term of patent 14 years
U.S. Cl. D14—118

304,186
COMBINED COPYING MACHINE, FACSIMILE TRANSMITTER/RECEIVER AND PRINTER
Fumiyo Kojima, Mitaka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Oct. 6, 1987, Ser. No. 105,191
Claims priority, application Japan, Apr. 6, 1987, 62-013322
Term of patent 14 years
U.S. Cl. D14—118



304,187
FACSIMILE
Hiroshi Komatsu, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 24, 1987, Ser. No. 124,768
Claims priority, application Japan, May 28, 1987, 62-21649
Term of patent 14 years
U.S. Cl. D14—118

304,188
PORTABLE HANDSET RADIO TELEPHONE
Shigeru Sutoh, Urawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Mar. 24, 1988, Ser. No. 172,355
Claims priority, application Japan, Nov. 5, 1987, 62-44921
Term of patent 14 years
U.S. Cl. D14—138

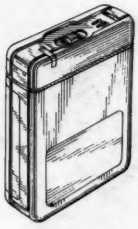


304,189
HOUSING FOR PORTABLE HANDSET TELEPHONE OR SIMILAR ARTICAL
Albert L. Nagele, Wilmette, and Leonid Soren, Lincolnwood, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Jul. 5, 1988, Ser. No. 218,507
Term of patent 14 years
U.S. Cl. D14—147

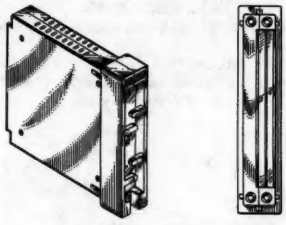
304,190
DEBIT CARD PUBLIC PAY TELEPHONE STAND
Martin S. Rose, Sudbury, England, assignor to GEC Plessey Telecommunications Ltd., Coventry, England
Filed Jun. 14, 1988, Ser. No. 206,683
Claims priority, application United Kingdom, Dec. 16, 1987, 1407133
Term of patent 14 years
U.S. Cl. D14—142

304,191
RADIO PAGING RECEIVER
Isamu Sekine, Kawagoe, Japan, assignor to Kokusai Denki Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 4, 1987, Ser. No. 117,642
Claims priority, application Japan, May 19, 1987, 62-19359
Term of patent 14 years
U.S. Cl. D14—192

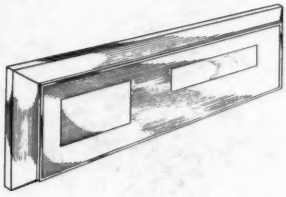
304,192
RADIO PAGER
Sigeki Hayasaka, and Mamoru Takahashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Feb. 5, 1988, Ser. No. 152,608
Claims priority, application Japan, Aug. 6, 1987, 62-32235
Term of patent 14 years
U.S. Cl. D14—191



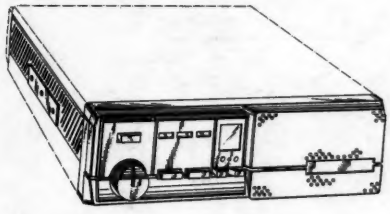
304,193
CARTRIDGE FOR TELEPHONE SYSTEM EQUIPMENT CABINET
Willi Lotz, Carp, Canada, assignor to Mitel Corporation, Canada
Filed Nov. 18, 1986, Ser. No. 931,789
Claims priority, application Canada, Aug. 21, 1986, 21-08-86-15
Term of patent 14 years
U.S. Cl. D14—240



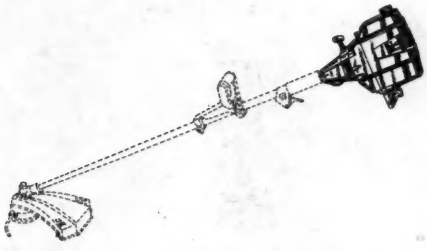
304,194
RADIO CABINET FRONT
Thomas G. Fuller; Michael H. Stock, and Hoawrd F. Weckel, III, all of Elkhart, Ind., assignors to Mito Corporation, Elkhart, Ind.
Filed Jul. 7, 1986, Ser. No. 882,849
Term of patent 14 years
U.S. Cl. D14—257



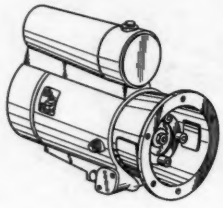
304,195
FRONT AND SIDE PANELS FOR A TWO-WAY MOBILE RADIO
Richard Culbertson, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.
Filed Oct. 20, 1986, Ser. No. 922,445
Term of patent 14 years
U.S. Cl. D14—265



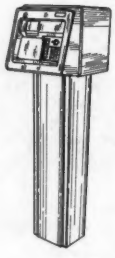
304,196
POWER HEAD FOR A VEGETATION CUTTER
Lloyd H. Tuggle, and Jeffery G. Sadler, both of Shreveport, La., assignors to White Consolidated Industries, Inc., Cleveland, Ohio
Filed Dec. 11, 1987, Ser. No. 131,537
Term of patent 14 years
U.S. Cl. D15—1



304,197
AIR COMPRESSOR
Boldrini Adolfo, Milan, Italy, assignor to Ing. Enea Mattei S.p.A., Vimodrone, Italy
Filed Jul. 21, 1987, Ser. No. 76,562
Claims priority, application Italy, Feb. 2, 1987, 20717/87[U]
Term of patent 14 years
U.S. Cl. D15—9

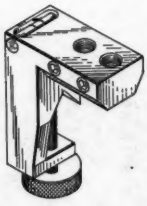


304,198
MOTOR FUEL DISPENSING CONTROL TERMINAL OR SIMILAR ARTICLE
Douglas G. Long, North Canton, Ohio, assignor to Diebold, Incorporated, Canton, Ohio
Filed Jun. 20, 1986, Ser. No. 877,547
Term of patent 14 years
U.S. Cl. D15—9.1

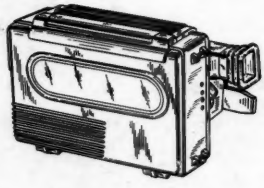


304,199
VANE FOR THROWING WHEEL
James H. Carpenter, Hagerstown, Md., assignor to Pangborn Corporation, Inc., Hagerstown, Md.
Filed Nov. 3, 1986, Ser. No. 926,240
Term of patent 14 years
U.S. Cl. D15—126

304,200
HOLDER FOR TOOL SETTER GAUGE
Philip A. MacKelvie, Silver Plume, Colo., assignor to Technical Tools, Inc., Lakewood, Colo.
Filed May 4, 1987, Ser. No. 45,677
Term of patent 14 years
U.S. Cl. D15—140

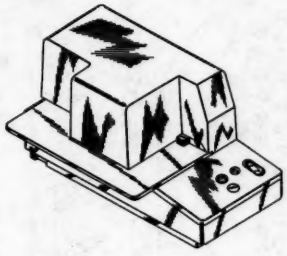


304,201
CASE FOR VIDEO CAMERA COMBINED WITH VIDEO TAPE RECORDER
Takuya Niitsu, Kawasaki, and Akinari Mohri, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Jun. 27, 1986, Ser. No. 879,467
Claims priority, application Japan, Jan. 7, 1986, 61-120
Term of patent 14 years
U.S. Cl. D16—202



304,202
CASE FOR VIDEO CAMERA COMBINED WITH VIDEO TAPE RECORDER
Takuya Niitsu, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Jun. 26, 1986, Ser. No. 879,190
Claims priority, application Japan, Jan. 13, 1986, 61-717
Term of patent 14 years
U.S. Cl. D16—204

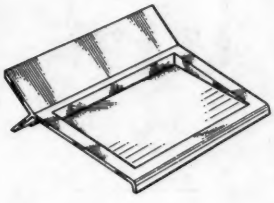
304,203
SLIP PRINTER OR SIMILAR ARTICLE
Shuzo Kato, Hiratsuka; Satoru Sakama, Isehara, and Tamihei Takahashi, Atsugi, all of Japan, assignors to NCR Corporation, Dayton, Ohio
Filed Jul. 11, 1986, Ser. No. 884,818
Claims priority, application Japan, Mar. 27, 1986, 10933/86
Term of patent 14 years
U.S. Cl. D18—13



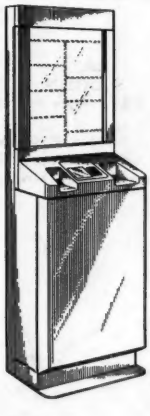
304,204
COPYING MACHINE
Eiko Wada, Yokohama, and Yuichi Seki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 15, 1986, Ser. No. 941,934
Claims priority, application Japan, Jun. 16, 1986, 23150/1986
Term of patent 14 years
U.S. Cl. D18—37

304,205
PAPER CLIP
Kurt Lorber, and Beate Lorber, both of Aichwald, Fed. Rep. of Germany, assignors to Laurel-Plastic Kurt Lorber, Fed. Rep. of Germany
Filed Jul. 8, 1986, Ser. No. 883,151
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1986, GR II 454/86
Term of patent 14 years
U.S. Cl. D19—65

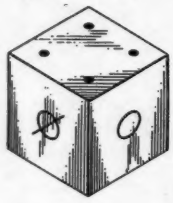
304,206
MEMO TRAY
Henry Sawatsky; Richard K. Sawatsky, and David P. Sawatsky, all of Brampton, Canada, assignors to Precisioncraft Limited, Ontario, Canada
Filed Jan. 23, 1986, Ser. No. 824,566
Claims priority, application Canada, Nov. 27, 1985, 27-11-85-1
Term of patent 14 years
U.S. Cl. D19—86



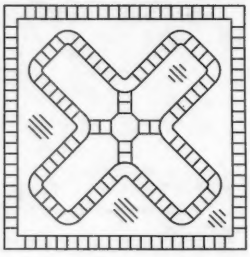
304,207
COUPON DISPENSING TERMINAL
John C. Wistrand, New Canaan, Conn., assignor to The Savings Spot, Ltd., Providence, R.I.
Filed May 27, 1986, Ser. No. 867,377
Term of patent 14 years
U.S. Cl. D20—2



304,208
LOTTERY DIE
Frank Loftus, 2221 20th St., Apt. #5, Santa Monica, Calif. 90405
Filed Dec. 4, 1986, Ser. No. 938,129
Term of patent 14 years
U.S. Cl. D21—41

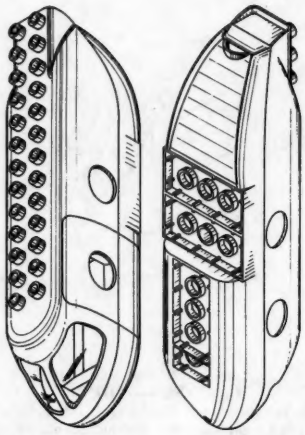


304,209
GAME BOARD DESIGN
James M. Guidotti, 2502 S. Colorado St., Philadelphia, Pa. 19145
Filed Dec. 5, 1986, Ser. No. 938,758
Term of patent 14 years
U.S. Cl. D21—34

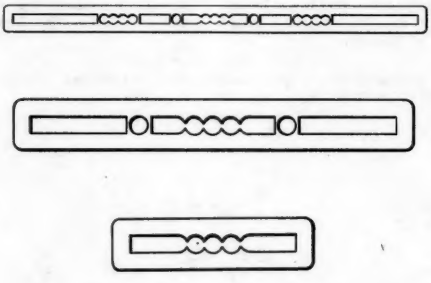


304,210
SCOOTER
Frank Fonte, Tampa, Fla., assignor to C & S Manufacturing, Tampa, Fla.
Continuation-in-part of Ser. No. 25,836, Mar. 13, 1987. This application May 4, 1987, Ser. No. 45,148
Term of patent 14 years
U.S. Cl. D21—81

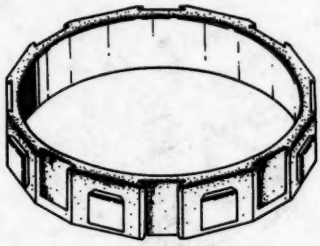
304,211
BODY ELEMENT FOR A TOY AIRCRAFT
Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 128,482
Term of patent 14 years
U.S. Cl. D21—91



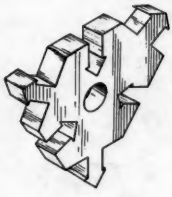
304,212
TOY CONSTRUCTION LINK
Dennis Moe, 2344 State Hwy. 16, La Crosse, Wis. 54601
Filed Jan. 23, 1987, Ser. No. 6,618
Term of patent 14 years
U.S. Cl. D21—108



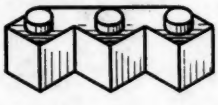
304,213
TOY CONSTRUCTION RING
Chen-Tsung Chen, No. 16, Alley 2, Lane 7, Feng-Tung Rd., Taichung, Taiwan
Filed Jul. 22, 1987, Ser. No. 76,198
Term of patent 14 years
U.S. Cl. D21—108



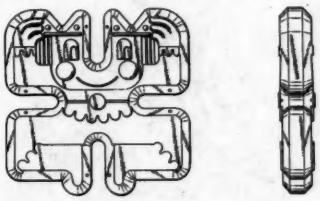
304,214
HEXAGONAL LOCKING TOY BLOCK
Kevin S. Buist, Montgomery, N.J., assignor to Design Visions, Inc., Belle Mead, N.J.
Filed Aug. 20, 1987, Ser. No. 87,627
Term of patent 14 years
U.S. Cl. D21—108



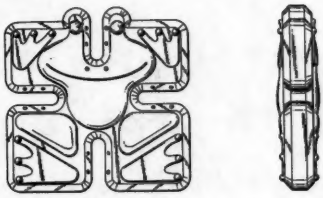
304,215
BEVELLED TOY CONSTRUCTION ELEMENT
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 128,478
Term of patent 14 years
U.S. Cl. D21—108



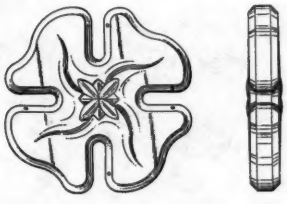
304,216
SIMULATIVE CONSTRUCTION TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jan. 27, 1988, Ser. No. 150,557
Term of patent 14 years
U.S. Cl. D21—108



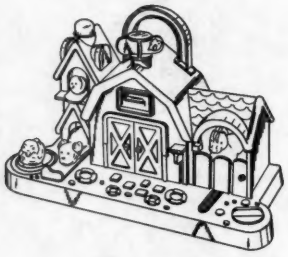
304,217
FROG CONSTRUCTION TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jan. 27, 1988, Ser. No. 150,558
Term of patent 14 years
U.S. Cl. D21—108



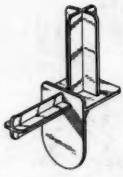
304,218
LILY PAD CONSTRUCTION TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jan. 27, 1988, Ser. No. 150,563
Term of patent 14 years
U.S. Cl. D21—108



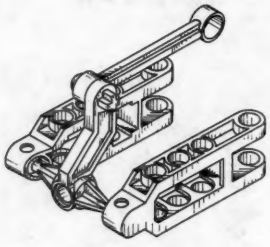
304,219
TOY BARN
Steven Taylor, Minnetonka, Minn., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 17, 1986, Ser. No. 920,800
Term of patent 14 years
U.S. Cl. D21—116



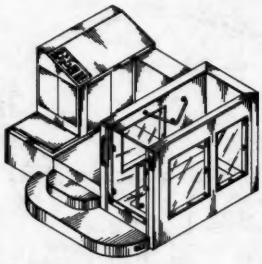
304,220
AXLE ELEMENT FOR A CONSTRUCTION TOY
Vic Bertrand, Dollard des Ormeaux, Canada, assignor to The Ritvik Group Inc., Dorval, Canada
Filed Sep. 21, 1987, Ser. No. 99,206
Claims priority, application Canada, May 6, 1987, 06-06-87-10
Term of patent 14 years
U.S. Cl. D21—141



304,221
WHEEL SUSPENSION UNIT FOR A TOY VEHICLE
Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 127,884
Term of patent 14 years
U.S. Cl. D21—141



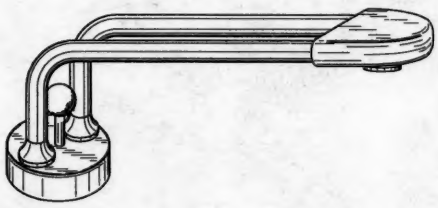
304,222
COMBINED UNDERWATER TREADMILL AND STATION THEREFOR
Jeff Keller, and Robert Linton, both of Edmonds, Wash., assignors to Edmonds Medical Systems, Inc., Edmonds, Wash.
Filed Feb. 12, 1987, Ser. No. 13,619
Term of patent 14 years
U.S. Cl. D21—192



304,223
RIFLE STOCK WITH INSERTS
William B. Ruger, Croydon, N.H., and Lawrence L. Larson, Branford, Conn., assignors to Sturm, Ruger & Company, Inc., Southport, Conn.
Filed Jan. 10, 1986, Ser. No. 817,713
Term of patent 14 years
U.S. Cl. D22—108

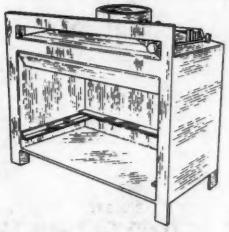
304,224
FLOW CONTROL VALVE FOR LAWN SPRINKLER
Dennis A. Wilson, Wauconda Township, Lake County; Dennis W. Anesi, Rolling Meadows, and Mark S. Williamsen, Evanston, all of Ill., assignors to Ansan Industries Ltd., Harwood Heights, Ill.
Filed Apr. 28, 1986, Ser. No. 858,233
Term of patent 14 years
U.S. Cl. D23—245

304,225
SPOUT
Bethany Lathrop, Los Angeles, Calif., assignor to Aloys F. Dornbracht GmbH & Co. KG, Iserlohn, Fed. Rep. of Germany
Filed Jan. 28, 1986, Ser. No. 823,375
Claims priority, application France, Jul. 29, 1985, 85 3654; Oct. 9, 1985, 85 4715
Term of patent 14 years
U.S. Cl. D23—257

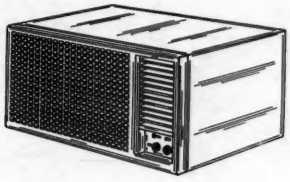


304,226
COVER FOR JARS OF FRAGRANCE, JEWELRY OR SIMILAR ARTICLE
Yun S. Kim, and Mee S. Kim, both of 5702 Oak Stake Ct., Burke, Va. 22015
Filed Oct. 24, 1986, Ser. No. 923,713
Term of patent 14 years
U.S. Cl. D23—267

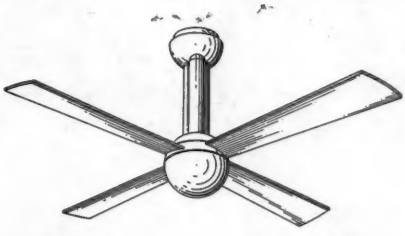
304,227
FIREPLACE
Bruce V. Benfield; Peter J. Benfield, both of North Haven; Tim T. Pyyvaara, Port Noarlunga; Victor L. Bishop, Klemzig, and Stuart L. Speck, Wynnvale, all of Australia, assignors to Heatshield PTY. Ltd., Australia
Filed Aug. 7, 1987, Ser. No. 83,416
Claims priority, application Australia, Feb. 10, 1987, 395/87
Term of patent 14 years
U.S. Cl. D23—344



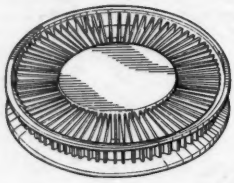
304,228
AIR CONDITIONER
Hiroshi Moritani, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 25, 1987, Ser. No. 125,073
Claims priority, application Japan, May 29, 1987, 62-22485
Term of patent 14 years
U.S. Cl. D23—353



304,229
CEILING FAN
Ron Rezek, Los Angeles, Calif., assignor to Beverly Hills Trading Company, Inc., North Hollywood, Calif.
Filed Apr. 12, 1988, Ser. No. 180,793
Term of patent 14 years
U.S. Cl. D23—377

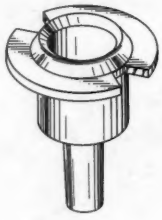


304,230
CERAMIC HEATING ELEMENT
Tim Wang, No. 80, Yung Feng Rd., Tai-Ping Village, Taiwan
Filed Oct. 21, 1987, Ser. No. 111,971
Term of patent 14 years
U.S. Cl. D23—386

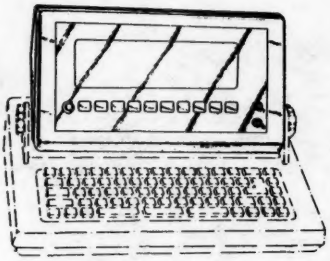


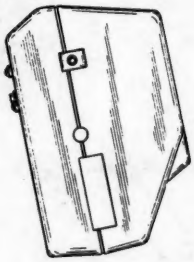
304,231
SUBGINGIVAL DELIVERY TIP FOR ATTACHMENT TO DENTAL IRRIGATION INSTRUMENTS
Robert D. Stream, Fort Collins, Colo., assignor to Teledyne Industries, Inc., Fort Collins, Colo.
Filed Sep. 25, 1987, Ser. No. 101,277
Term of patent 14 years
U.S. Cl. D24—15

304,232
BREATH SAMPLE RECEIVING MOUTHPIECE
Kip L. Fuller, Denver, Colo., assignor to Guardian Technologies, Inc., Cincinnati, Ohio
Filed May 1, 1987, Ser. No. 45,871
Term of patent 14 years
U.S. Cl. D24—17

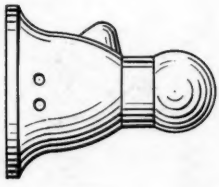


304,233
HOUSING FOR AN AUTOMATED BLOOD PRESSURE AND OTHER VITAL SIGNS MONITORING DEVICE
Maynard Ramsey, III; James Muskatello, both of Tampa, Fla.; Arthur Burton, Califon, N.J.; Kenneth Alexander, Palm Harbor, and John George, Clearwater, both of Fla., assignors to Critikon, Inc., Tampa, Fla.
Filed Apr. 28, 1987, Ser. No. 43,679
Term of patent 14 years
U.S. Cl. D24—21

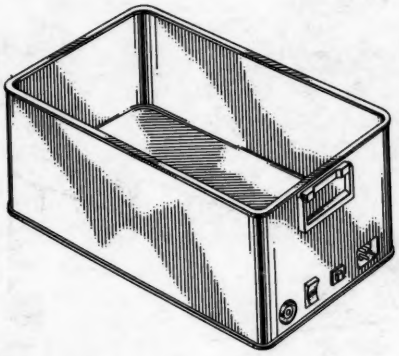




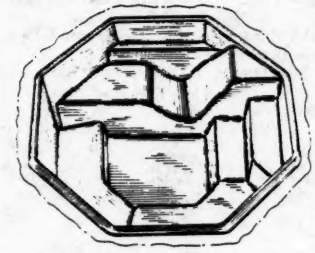
304,234
ANNULAR ANVIL FOR A SURGICAL STAPLER
David T. Green, Norwalk, and Keith Ratcliff, Sandy Hook, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.
Filed Apr. 21, 1987, Ser. No. 41,314
Term of patent 14 years
U.S. Cl. D24—27

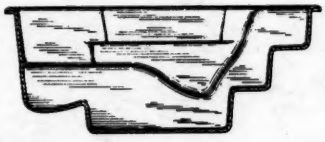


304,235
FOOT BATH
Arthur E. Chambers, 21421 N. Seventh Avenue, Phoenix, Ariz. 85027
Filed May 14, 1987, Ser. No. 49,416
Term of patent 14 years
U.S. Cl. D24—38

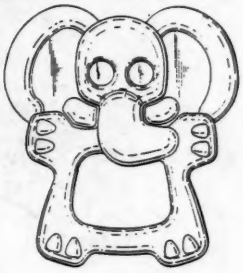


304,236
TUB SHELL FOR A HYDROTHERAPY SPA OR THE LIKE
Robert C. Giese, Sheboygan, Wis., and Keith L. Poulson, Canyon Country, Calif., assignors to Kohler Co., Kohler, Wis.
Filed Nov. 12, 1987, Ser. No. 119,429
Term of patent 14 years
U.S. Cl. D24—38



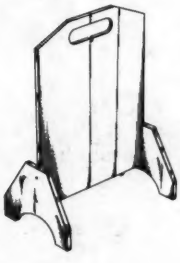


304,237
TEETHER
Kevin Daykin, Hollowell, England, assignor to Hestair Keddicraft Limited, Bristol, England
Filed May 1, 1987, Ser. No. 45,664
Claims priority, application United Kingdom, Nov. 4, 1986, 1037802
Term of patent 14 years
U.S. Cl. D24—45

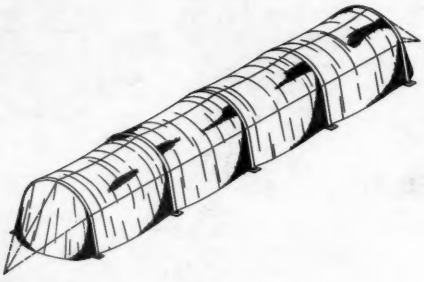


304,238
BANDAGE
Margaret Palau, P.O. Box 880, Brookline, Mass. 02146
Filed Feb. 13, 1987, Ser. No. 14,347
Term of patent 14 years
U.S. Cl. D24—49

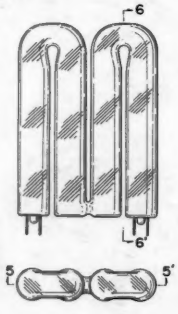
304,239
BODY WASTE COLLECTION BAG STAND
Kevin Miller, 201 Ellis Pkwy., Piscataway, N.J. 08854
Filed Nov. 30, 1987, Ser. No. 126,954
Term of patent 14 years
U.S. Cl. D24—51



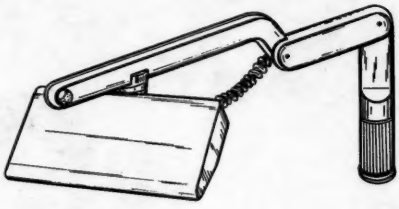
304,240
BATTING CAGE
Robert L. Wright, Des Moines, Iowa, assignor to Creative Athletic Products and Services, Inc., Des Moines, Iowa
Filed Feb. 24, 1986, Ser. No. 834,874
Term of patent 14 years
U.S. Cl. D25—1



304,241
FLUORESCENT LAMP TUBE
Taketo Kamei, Yokosuka, and Masashi Saigo, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Feb. 3, 1987, Ser. No. 10,568
Claims priority, application Japan, Aug. 8, 1986, 61-30877
Term of patent 14 years
U.S. Cl. D26—3



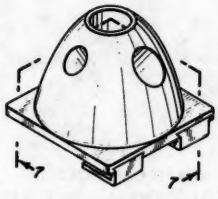
304,242
TABLE-MOUNTED ADJUSTABLE LAMP
Fritz Sträter, Unterm Bamberg 1, D-5882 Meinerzhagen, Fed. Rep. of Germany
Filed Oct. 23, 1986, Ser. No. 922,560
Claims priority, application World Int. Prop. O., Apr. 24, 1986, DM/006835
Term of patent 14 years
U.S. Cl. D26—65



304,243
FLUORESCENT LAMP WITH SIMULATIVE GASLIGHT COVER
John J. Zwald, Marblehead, Mass., assignor to GTE Products Corporation, Danvers, Mass.
Filed Oct. 14, 1986, Ser. No. 918,459
Term of patent 14 years
U.S. Cl. D26—4

304,244
PHARMACEUTICAL TABLET
Geoffrey D. Tovey, Harpenden, England, assignor to Smith Kline & French Laboratories, Ltd., Welwyn Garden City, England
Filed Mar. 20, 1987, Ser. No. 28,626
Claims priority, application United Kingdom, Sep. 26, 1986, 1037014
The portion of the term of this patent subsequent to Aug. 29, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D28—2

304,245
HAIR CARE APPLIANCE STAND
Rosemarie Ianni, 15546 Friar St., Van Nuys, Calif. 91411
Filed Dec. 29, 1986, Ser. No. 947,554
Term of patent 14 years
U.S. Cl. D28—73

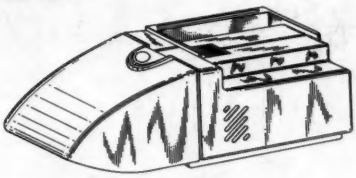


304,246
AQUARIUM
Robert M. Ross, Jr., Garland, and Robert J. McNally, Richardson, both of Tex., assignors to Great Western Trading Corp., Plano, Tex.
Filed May 16, 1988, Ser. No. 194,555
Term of patent 14 years
U.S. Cl. D30—102

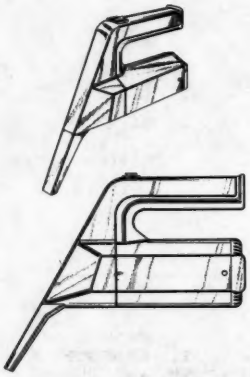
304,247
AQUARIUM
Robert M. Ross, Jr., Garland, and Robert J. McNally, Richardson, both of Tex., assignors to Great Western Trading Corp., Plano, Tex.
Filed May 16, 1988, Ser. No. 194,560
Term of patent 14 years
U.S. Cl. D30—102

304,248
LITTER SCOOP
Elliot Elrod, 5254 Enfield, Skokie, Ill. 60077
Filed Jun. 9, 1986, Ser. No. 872,413
Term of patent 14 years
U.S. Cl. D30—162

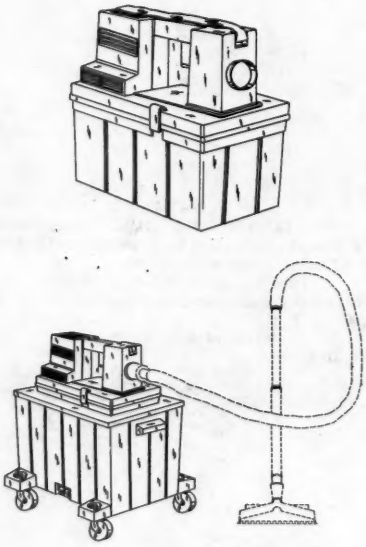
304,249
VACUUM CLEANER WITH ADJUSTABLE HANDLE
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Aug. 12, 1987, Ser. No. 84,109
Claims priority, application United Kingdom, Mar. 30, 1987, 1 041 128
Term of patent 14 years
U.S. Cl. D32—18



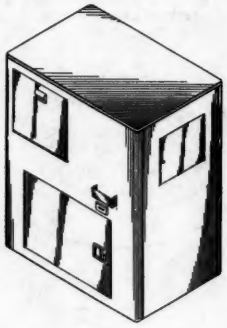
304,250
HAND HELD VACUUM CLEANER
H. Charles Hassel, Los Angeles, Calif., and Clifford Ghetti, Belvidere, N.J., assignors to MicroComputer Accessories Inc., Los Angeles, Calif.
Filed Oct. 1, 1987, Ser. No. 103,506
Term of patent 14 years
U.S. Cl. D32—18



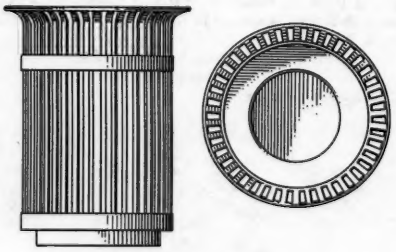
304,251
DUAL VACUUM CLEANER DESIGN
Emerson J. Purkapile, Chicago, Ill., assignor to Philips Home Products, Akron, Ohio
Filed Feb. 22, 1988, Ser. No. 136,642
Term of patent 14 years
U.S. Cl. D32—21



304,252
ELECTRONICALLY CONTROLLED CLOTHING RECEPTACLE OR SIMILAR ARTICLE
William R. Ferguson, 804 Lockwood, Richardson, Tex. 75080
Filed May 4, 1987, Ser. No. 45,303
Term of patent 14 years
U.S. Cl. D32—37



304,253
TRASH CAN HOLDER
Gerald P. Skalka, Washington, D.C., assignor to Victor Stanley, Inc., Dunkirk, Md.
Filed May 28, 1987, Ser. No. 58,026
Term of patent 14 years
U.S. Cl. D34—6

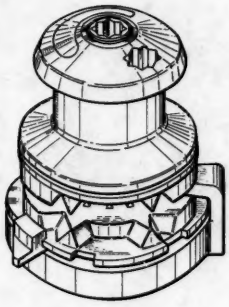


304,254

VERTICAL MARINE WINDLASS

Gordon M. Lyall, Glasgow, and Philip F. McCarron, Paisley, both of Scotland, assignors to Simpson-Lawrence Limited, Glasgow, Scotland

Filed Feb. 14, 1986, Ser. No. 834,033
Term of patent 14 years
U.S. Cl. D34—33



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 24TH DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. C. Nielsen Company: *See*—
Kiewit, David A., 4,876,736, Cl. 455-2.000.

A. Monforts GmbH & Co.: *See*—
van Wersch, Kurt; Freiberg, Helge; and Mevissen, Peter, 4,875,942, Cl. 134-15.000.

A. O. Smith Corporation: *See*—
Kramer, David W., 4,875,465, Cl. 126-391.000.

ABC Auto Alarms, Inc.: *See*—
Faust, James H., 4,875,350, Cl. 70-241.000.

Abe, Akira; Nakajima, Junya; Takase, Haruo; Uenaka, Kazushige; and Otomo, Ruyzi, to Fuji Photo Film Co., Ltd. Method of and apparatus for processing silver halide-containing photosensitive material for color photography. 4,876,180, Cl. 430-393.000.

Abe, Kunihoro, to Fuji Jukogyo Kabushiki Kaisha. Air-fuel ratio control system for an engine. 4,875,453, Cl. 123-440.000.

Abe, Masami: *See*—
Ishii, Yoh; Abe, Masami; Harada, Yuhzoh; Takasugi, Atsumi; and Kato, Kazumi, 4,875,519, Cl. 164-465.000.

Abernathy, Joe V.: *See*—
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Abernathy, Joe V.; and Wooldridge, Timothy A., 4,875,989, Cl. 204-298.000.

ABG Semca: *See*—
Signoret, Jacques, 4,875,345, Cl. 62-402.000.

Abrahms, Robert M.: *See*—
Messner, Kirsten L.; Abrahms, Robert M.; and Beitelia, Ray R., 4,875,489, Cl. 128-772.000.

Abrashkin, Shmuel: *See*—
Issachar, David; Trumper, Jacob; and Abrashkin, Shmuel, 4,876,073, Cl. 423-2.000.

Abrego, Elsa: *See*—
MacDonald, Robert C.; and Abrego, Elsa, 4,875,554, Cl. 187-124.000.

Abuaf, Nesim: *See*—
Rasmussen, Neil S.; Szema, Li-Chieh; and Abuaf, Nesim, 4,875,339, Cl. 60-757.000.

Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Electric power steering control system. 4,875,539, Cl. 180-79.100.

ACCRA Manufacturing Co.: *See*—
Finch, Jack A., 4,875,290, Cl. 33-265.000.

ACF Industries, Incorporated: *See*—
Coulborn, John W.; and Krug, John A., 4,875,417, Cl. 105-248.000.

Ache, Hans-Joachim: *See*—
Gusten, Hans; Ache, Hans-Joachim; Rinke, Monika; and Wirth, Hermann O., 4,876,029, Cl. 252-301.170.

Ackeret, Peter, to IDN Inventions and Development of Novelties AG. Container for magnetic tape cassettes. 4,875,584, Cl. 206-387.000.

Actel Corporation: *See*—
Mohsen, Amr M.; Hamdy, Esmat Z.; and McCollum, John L., 4,876,220, Cl. 437-170.000.

Active Memory Technology Ltd.: *See*—
Cowley, Colin H., 4,876,641, Cl. 364-200.000.

Actron Manufacturing Company: *See*—
Frantz, Leo R.; Bauer, Alfred; Koran, Matthew H.; and Becker, Jack, 4,876,416, Cl. 200-11.00R.

Adachi, Hiromitsu: *See*—
Kubota, Shin'ichi; Miyano, Hideyo; and Adachi, Hiromitsu, 4,876,529, Cl. 340-450.300.

Adachi, Tatsuya: *See*—
Kaito, Takashi; and Adachi, Tatsuya, 4,876,112, Cl. 427-38.000.

Adams, Charles A. Cylinderical apparatus for holding table skirting for wrinkle removal. 4,875,301, Cl. 38-14.000.

Adams, Lowell J.; Simshauser, Steven C.; Pisarski, Nathan; and Weisend, Norbert A., Jr., to B. F. Goodrich Company, The. Electro-repulsive separation system for deicing. 4,875,644, Cl. 244-134.00R.

Adams, Paul E.; and Kinzer, Darryl W., to Lubrizol Corporation, The. Process for manufacturing amides. 4,876,374, Cl. 558-109.000.

Adams, William R.: *See*—
Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 4,875,995, Cl. 208-152.000.

Adept Technology, Inc.: *See*—
Roth, Scott D., 4,876,728, Cl. 382-21.000.

Adin, Anthony: *See*—
Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, 4,876,181, Cl. 430-522.000.

Adler, Alfons: *See*—
Fuhrer, Wolfgand; Kuhle, Engelbert; Adler, Alfons; and Hanssler, Gerd, 4,876,253, Cl. 514-241.000.

ADT Security Systems, Inc.: *See*—
Roy, Bernard J. J.; O'Connor, Lorne D.; Rioux, Philippe F.; Dingle, Donald A.; and Raymond, Andre L., 4,876,597, Cl. 358-141.000.

Advance Transformer Co.: *See*—
Joanino, Fernando A., 4,876,486, Cl. 315-290.000.

Advanced Cardiovascular Systems, Inc.: *See*—
Messner, Kirsten L.; Abrahms, Robert M.; and Beitelia, Ray R., 4,875,489, Cl. 128-772.000.

Advanced Lasers Limited: *See*—
Hughes, John L., 4,876,694, Cl. 372-93.000.

Advanced Micro Devices, Inc.: *See*—
Shankar, Kapil; and Agrawal, Om, 4,876,640, Cl. 364-200.000.

Advanced Techtronics, Inc.: *See*—
Rapoport, Uri; and Panosh, Richard, 4,875,486, Cl. 128-653.000.

Agracetus Corporation: *See*—
Paau, Alan, 4,875,921, Cl. 71-7.000.

Agrawal, Om: *See*—
Shankar, Kapil; and Agrawal, Om, 4,876,640, Cl. 364-200.000.

Agrawal, Rakesh; Auvil, Steven R.; and Deeba, Michel, to Air Products and Chemicals, Inc. Alkylation of aromatic amines with olefins on partially dealuminated zeolites. 4,876,377, Cl. 558-416.000.

Agria-Werke GmbH: *See*—
Saur, Niko K.; and Bronner, Wolfgang, 4,875,536, Cl. 180-6.320.

AHA Automotive Technologies Corporation: *See*—
Hodgson, Gordon; Broadhead, Douglas G.; and Parent, David J., 4,875,538, Cl. 180-379.000.

Aikman, Collin D.: *See*—
Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,876,320, Cl. 526-62.000.

Air Powder Systems: *See*—
Brors, Kenneth A., 4,875,629, Cl. 241-39.000.

Air Products and Chemicals, Inc.: *See*—
Agrawal, Rakesh; Auvil, Steven R.; and Deeba, Michel, 4,876,377, Cl. 558-416.000.

Airhart, Tom P., to Atlantic Richfield Company. Transducer for inducing seismic signals into an elastic medium. 4,875,544, Cl. 181-113.000.

Airxchange, Inc.: *See*—
Steele, Donald F.; Hoagland, Lawrence C.; Kyricos, Christopher; and Tolan, Peter, 4,875,520, Cl. 165-10.000.

Aisin AW Co. Ltd.: *See*—
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Ishikawa, Hitoshi, 4,875,422, Cl. 112-258.000.
Oka, Hiroki; and Nagura, Nobuyoshi, 4,876,527, Cl. 340-441.000.

Aisin Seiki Kabushikikaisha: *See*—
Kawai, Taneichi; Yasuda, Tomio; and Aoki, Koji, 4,876,649, Cl. 364-424.050.

Aisin-Warner Kabushiki Kaisha: *See*—
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, 4,875,392, Cl. 74-867.000.

Aiyama, Fumihiko: *See*—
Hirayama, Koji; and Aiyama, Fumihiko, 4,875,384, Cl. 74-500.500.

Ajinomoto Co., Inc.: *See*—
Nozoe, Shigeo; and Ohta, Tomihisa, 4,876,383, Cl. 560-163.000.

Akahoshi, Haruo; Murakami, Kanji; Kawamoto, Mineo; Tadokoro, Akio; and Yoshimura, Toyofusa, to Hitachi, Ltd. Process for producing printed circuit board. 4,876,177, Cl. 430-313.000.

Akao, Mutsuo; Osanai, Hiroyuki; and Inoue, Koji, to Fuji Photo Film Co., Ltd. Gusset bag for photographic photosensitive materials. 4,876,125, Cl. 428-35.200.

Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Packaging material for photographic photosensitive materials. 4,876,129, Cl. 428-359.000.

Akao, Shigeaki; and Taniguchi, Masato, to NGK Spark Plug Co., Ltd. Ceramic rocker arm. 4,875,442, Cl. 123-90.390.

Akiba, Jyuji, to Junkosha Co., Ltd. Attachment ring for a liquid leakage sensor used in drain openings. 4,875,359, Cl. 73-40.000.

Akimoto, Koichiro: *See*—
Suzuki, Yasuhito; Akimoto, Koichiro; Ohshima, Haime; Honda, Kazuyuki; and Isaka, Yukio, 4,876,562, Cl. 346-160.000.

Aktiebolaget Electrolux: *See*—
Johansson, Jan A.; Jonsson, Jan I.; and Lindstrom, Bjorn T., 4,875,555, Cl. 187-9.00R.

Albert, Winfried: *See*—
Schetters, Hartmut; Endl, Josef; and Albert, Winfried, 4,876,189, Cl. 435-7.000.

248-897 O.G.-89-18

Albrecht, Leonard N.; and Burke, Steven R., to Haining, Alvin S.; and Haining, Katherine R. Compact toilet seat cover. 4,875,242, Cl. 4-243.000.

Alcatel N.V.: *See—*
Witters, Hugo F. J.; and Wouters, Joannes C. A. M., 4,876,695, Cl. 375-3.000.

Alcon Laboratories, Inc.: *See—*
Clark, Abbot F., 4,876,250, Cl. 514-179.000.

Aldridge, Lewis L., to Ewal Manufacturing Co., Inc. Compact fluid powered actuator. 4,875,404, Cl. 92-130.00A.

Alexander, David C., to Texaco Inc. Oxyethylene bismaleimide derivatives. 4,876,358, Cl. 548-521.000.

Alfa-Laval Food and Dairy Engineering AB: *See—*
Holm, Sune, deceased; Malmberg, Rolf; and Svensson, Kjell, 4,876,100, Cl. 426-491.000.

Allanson, Division of Jannock Limited: *See—*
Duncan, Richard C., 4,876,496, Cl. 320-31.000.

Allard Avionics Corp.: *See—*
Hass, Hyman, 4,876,658, Cl. 364-550.000.

Allen-Bradley Company, Inc.: *See—*
Bittorf, Bradley J.; Flood, Mark A.; Kalan, Michael D.; and Sepsi, Robert R., 4,876,664, Cl. 364-900.000.
Thackston, Clyde D., 4,875,528, Cl. 173-12.000.

Allen, Christopher M.: *See—*
Hanson, Raymond; Tillyard, Malcolm; and Allen, Christopher M., 4,876,434, Cl. 219-215.000.

Allen, Robert C., to Shell Oil Company. Polymer processing. 4,876,307, Cl. 524-612.000.

Allen, Timothy P.: *See—*
Mead, Carver A.; and Allen, Timothy P., 4,876,534, Cl. 340-825.950.

Allied Colloids Limited: *See—*
Benn, Gerald; Farrar, David; and Flesher, Peter, 4,876,047, Cl. 562-41.000.

Allied-Signal Inc.: *See—*
Kelly, Robert J., 4,876,550, Cl. 342-451.000.
Khanna, Yash P.; Bhattacharjee, Himangshu R.; Kumar, Rakesh; Williams, Jon I.; and Sibilia, John P., 4,876,127, Cl. 428-35.700.
Killian, Kevin M., 4,876,447, Cl. 250-227.000.
Olson, Larry D.; and Pallardy, Eugene P., Jr., 4,876,325, Cl. 528-170.000.
Palanisamy, Thirumalai G.; and Mendelson, Stuart E., 4,876,495, Cl. 320-18.000.

Allred, Thomas O.: *See—*
Moyer, Donald L.; and Allred, Thomas O., 4,875,813, Cl. 410-9.000.

Alota, Santa; Ferrari, Vincenzo; Memmi, Massimo; Pacelli, Leonardo; and Ramundo, Susanna, to Centro Sviluppo Materiali SpA. Process for continuous electrodeposition of chromium metal and chromium oxide on metal surfaces. 4,875,983, Cl. 204-28.000.

Alpermann, Hans G.: *See—*
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.

Alps Electric Co., Ltd.: *See—*
Ide, Jun; and Iizumi, Tomoo, 4,876,618, Cl. 360-78.130.
Taniguchi, Yuji; and Banju, Masaru, 4,876,481, Cl. 313-502.000.
Yunokuchi, Ryu; Omori, Shinichi; and Ohkita, Masao, 4,875,276, Cl. 29-603.000.

Alsip, Bruce F., to Alsip & Company. Three dimensional game. 4,875,687, Cl. 273-241.000.

Alsip & Company: *See—*
Alsip, Bruce F., 4,875,687, Cl. 273-241.000.

Althaus, Hans-Ludwig: *See—*
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.

Alvarez, Isaac. Dual wheel lug nut tool. 4,875,395, Cl. 81-13.000.

Alvarez, Oscar M., to Bioderm, Inc. Multi-layer wound dressing having oxygen permeable and oxygen impermeable layers. 4,875,473, Cl. 128-155.000.

ALZA Corporation: *See—*
Theeuwes, Felix; and Wong, Patrick S. L., 4,876,093, Cl. 424-438.000.

AM International Corporation: *See—*
Ostermeier, Bruce H., 4,875,751, Cl. 350-96.180.

America Matrix, Inc.: *See—*
Nixdorf, Richard D., 4,875,616, Cl. 228-120.000.

America, William G., to Perkin-Elmer Corporation, The. High pressure column assembly for a liquid chromatograph system. 4,876,005, Cl. 210-198.200.

American Cyanamid Company: *See—*
Asato, Goro; and Tamura, Susan Y., 4,876,272, Cl. 514-450.000.
Morgan, Leonard J.; and Bell, Mark, 4,875,929, Cl. 71-121.000.
Torley, Lawrence W.; Johnson, Bernard D.; and Dusza, John P., 4,876,252, Cl. 514-224.800.

American Home Products Corporation: *See—*
Musser, John H.; Kreft, Anthony F., III; and Bender, Reinhold H. W., 4,876,346, Cl. 546-172.000.

American Medical Products, Inc.: *See—*
Blanch, G. Marsden, 4,876,110, Cl. 427-2.000.

American Medical Systems, Inc.: *See—*
Levius, Dezso K., 4,875,472, Cl. 128-79.000.

American Standard Inc.: *See—*
Hart, James E.; and Gaughan, Edward W., 4,875,739, Cl. 303-33.000.
Kurokawa, Masayuki, 4,875,958, Cl. 156-108.000.

American Telephone and Telegraph Company: *See—*
Barron, Salvador; and Coffman, James E., 4,876,717, Cl. 380-25.000.
Bose, Chinmoy B., 4,876,457, Cl. 250-563.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See—*
Chapin, John T.; and Sabia, Raffaele A., 4,876,303, Cl. 524-296.000.
Mullin, Francis J.; and Reed, William C., 4,875,952, Cl. 156-48.000.

American Telephone and Telegraph Company, AT&T Technologies, Inc.: *See—*
Baltzer, Gary L.; Lynch, Brian; and O'Brien, William D., Jr., 4,875,916, Cl. 65-2.000.

Ameron, Inc.: *See—*
Mercado, Hector P., 4,875,710, Cl. 285-24.000.

Amikura, Takashi; Fujiwara, Akihiro; Toyama, Masamichi; Ueda, Kouichi; and Kozuki, Susumu, to Canon Kabushiki Kaisha. Drive device for photographic lens. 4,876,564, Cl. 354-400.000.

Amoco Corporation: *See—*
Chiang, Weilong L.; Fjare, Douglas E.; and Nowicki, Neal R., 4,876,329, Cl. 528-353.000.
Holzhauer, Juergen K.; Michalak, Dennis J.; and Schammel, Wayne P., 4,876,386, Cl. 562-414.000.
Kukes, Simon G.; Miller, Jeffrey T.; and Gutberlet, Louis C., 4,875,991, Cl. 208-59.000.
Nowicki, Neal R.; and Thomka, Donald E., 4,876,385, Cl. 562-414.000.
Udovich, Carl A., 4,876,379, Cl. 560-158.000.
Young, Grant A.; Wakley, William D.; and Andrews, Steven L., 4,876,016, Cl. 210-739.000.

AMP Incorporated: *See—*
Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; and Sotolongo, Thomas J., 4,875,865, Cl. 439-101.000.
Fleak, David S.; Koegel, Keith S.; Long, William B.; Moist, Stanford C., Jr.; and Nauman, Warren D., 4,875,877, Cl. 439-497.000.
Reed, Carl G., 4,875,863, Cl. 439-79.000.

Anchor Hocking Corporation: *See—*
Ochs, Charles S., 4,875,594, Cl. 215-252.000.

Anderson, James R.; and Brander, Richard, to Beltone Electronics Corporation. Differental voltage controlled exponential current source. 4,876,499, Cl. 323-312.000.

Anderson, Jeffrey J.; and Moore, John S. Brazing of ink jet print head components using thin layers of braze material. 4,875,619, Cl. 228-190.000.

Anderson, Robert E.; and Baritz, Michael L., to Handy Button Machine Company. Tack button and method of making the same. 4,875,257, Cl. 24-90.00B.

Anderson, Robert E., to Grumman Aerospace Corporation. Structural connector utilizing tabbed support substructure. 4,875,795, Cl. 403-279.000.

Ando, Akira: *See—*
Kittaka, Toshihiko; Ando, Akira; and Sakabe, Yukio, 4,876,476, Cl. 310-320.000.

Ando, Katsuhiko: *See—*
Imura, Takeshi; Ando, Katsuhiko; Nakabayashi, Shigemitsu; and Hirose, Maki, 4,875,518, Cl. 164-119.000.

Ando, Kenji: *See—*
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, 4,875,810, Cl. 406-14.000.

Ando, Yasunori: *See—*
Ogata, Kiyoshi; Ando, Yasunori; Kamijo, Eiji; and Matsumura, Noriaki, 4,875,284, Cl. 29-830.000.

Andoh, Yasuhiro: *See—*
Mose, Tadao; Andoh, Yasuhiro; and Kitasin, Tatuhisa, 4,876,637, Cl. 363-37.000.

Andrews, Steven L.: *See—*
Young, Grant A.; Wakley, William D.; and Andrews, Steven L., 4,876,016, Cl. 210-739.000.

Andrews, T. Arthur; and Gibson, D. Glenn. Irrigation manager system with zone moisture control. 4,875,498, Cl. 137-78.300.

Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., to Telefind Corp. Paging system sublocal switch. 4,876,538, Cl. 340-825.260.

Anthony, Vivienne M.; Clough, John M.; DeFraine, Paul; and Godfrey, Christopher R. A., to Imperial Chemical Industries PLC. Pyridine derivatives and their use as fungicides. 4,876,264, Cl. 514-345.000.

Anzai, Hiroshi; and Futsuki, Atsunori, to Total Human Medical Laboratory Co., Ltd. Method for generating a low frequency electric stimulus signal and low frequency electric stimulus signal generating apparatus. 4,875,484, Cl. 128-421.000.

Aoki, Koji: *See—*
Kawai, Taneichi; Yasuda, Tomio; and Aoki, Koji, 4,876,649, Cl. 364-424.050.

Aoki, Masaru: *See—*
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, 4,875,434, Cl. 118-52.000.

Aoki, Tetuya: *See—*
Suzuki, Nobuhiko; and Aoki, Tetuya, 4,875,832, Cl. 417-222.000.

Aoki, Toshikazu: *See—*
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.

Aotani, Yoshimasa: *See—*
Maemoto, Kazuo; Iwasaki, Masayuki; Maeda, Minoru; and Aotani, Yoshimasa, 4,876,173, Cl. 430-271.000.

Aoyama, Motoo; Bessho, Yasunori; Uchikawa, Sadao; Takeda, Renzo; and Ishii, Yoshihiko, to Hitachi, Ltd. Fuel assembly. 4,876,062, Cl. 376-444.000.

Aoyama, Takeo; Imai, Teruo; Hattori, Junichi; and Uehara, Mikio, to Nippon Petrochemicals Co., Ltd. Method for preparing molded articles of ultra-high molecular weight polyethylene. 4,876,049, Cl. 264-49.000.

Aoyama, Tatsuaki: *See—*
Mizuno, Shinji; Kawato, Humio; Hanazawa, Kazuyoshi; Aoyama, Tatsuaki; and Ogasawara, Yoshinari, 4,875,911, Cl. 55-162.000.

Apel, Howard L., to Texaco Inc. Partial oxidation of low heating value hazardous waste petroleum products. 4,875,906, Cl. 48-197.00R.

Appeldorn, Roger H., to Minnesota Mining and Manufacturing Company. Intermeshable article. 4,875,259, Cl. 24-576.000.

Applebaum, Joy D.; Bayne, Marvin L.; and Cascieri, Margaret A., to Merck & Co., Inc. Human insulin-like growth factor analoges with reduced binding to serum carrier proteins and their production in yeast. 4,876,242, Cl. 514-3.000.

Applied Material Handling, Inc.: *See—*
Wilde, Daniel R., 4,875,327, Cl. 53-475.000.

Applied Micro Circuits Corporation: *See—*
Tobias, Eric; and Chen, Chau-Shiong A., 4,876,216, Cl. 437-67.000.

Arad, Avi; and Kennedy, Melvin R., to Tiger Electronics, Inc. Skipping toy and method of playing same. 4,875,675, Cl. 272-74.000.

Aragon, Pedro J. Electrolytic cell. 4,875,988, Cl. 204-265.000.

Arai, Yoshimasa; Enamito, Satoshi; and Oda, Noriyuki, to Asahi Glass Company, Ltd. Apparatus and method for treating an exhaust gas from a diesel engine. 4,875,335, Cl. 60-274.000.

Arakawa, Kohei; and Ohsaki, Takashi, to Nikkiso Co., Ltd. Process for preparing carbon fibers in gas phase growth. 4,876,078, Cl. 423-447.300.

Archer, Lee A.; and Brownell, Kenneth W., Jr., to Brintec Corporation. Field terminable modular connector. 4,875,875, Cl. 439-401.000.

Arcus, Christopher G., to Ixys Corporation. Circuit for sensing FET or IGBT drain current over a wide dynamic range. 4,876,517, Cl. 330-277.000.

Ardini, Joseph L.; Lefsky, Brian; and Farr, Barbara J., to Prime Computer, Inc. Method and apparatus for high accuracy measurment of VLSI components. 4,876,501, Cl. 324-73.00R.

Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, to Fujikura Rubber Ltd. Diaphragm type of pilot operated directional control valve. 4,875,500, Cl. 137-596.180.

Arita, Masujiro; and Sugimoto, Yukinobu, to Mitsubishi Rayon Engineering Co., Ltd.; and Mitsubishi Rayon Co., Ltd. Method for separating and concentrating an organic component from an aqueous solution containing same. 4,875,980, Cl. 203-14.000.

Armour Pharmaceutical Company: *See—*
Feldman, Fred; Klekamp, Mark S.; Hrinda, Michael E.; Shaw, Arthur B.; and Chandra, Sudhish, 4,876,241, Cl. 514-2.000.

Armstrong International, Inc.: *See—*
Schlesch, Ronald D.; Armstrong, Merrill H.; Vallery, Stafford J.; and Durham, Harold S., 4,875,428, Cl. 114-255.000.

Armstrong, Marty A.: *See—*
Armstrong, Monroe A.; and Armstrong, Marty A., 4,875,462, Cl. 126-29.000.

Armstrong, Merrill H.: *See—*
Schlesch, Ronald D.; Armstrong, Merrill H.; Vallery, Stafford J.; and Durham, Harold S., 4,875,428, Cl. 114-255.000.

Armstrong, Monroe A.; and Armstrong, Marty A. Campfire smokestack. 4,875,462, Cl. 126-29.000.

Armstrong, W. Ted. Swing board toy. 4,875,672, Cl. 272-33.00R.

Aron, Jerome, to Kuhn, S.A. Hay making machine. 4,875,332, Cl. 56-377.000.

Arriveau, Claude: *See—*
Guyomard, Daniel; Torrez, Gerald; Lambour, Jean-Michel; and Arriveau, Claude, 4,876,111, Cl. 427-31.000.

Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., to Per Arvid Emil Carlsson. 1-alkyl-2-aminotetralin derivatives. 4,876,284, Cl. 514-657.000.

Asahi Glass Company, Ltd.: *See—*
Arai, Yoshimasa; Enamito, Satoshi; and Oda, Noriyuki, 4,875,335, Cl. 60-274.000.
Oda, Noriyuki; Takehara, Tetsuo; Higashi, Katsumi; and Muramatsu, Keiji, 4,875,712, Cl. 285-47.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Suzuki, Noboru; Toji, Shigeo; and Uenaka, Yukio, 4,876,603, Cl. 358-227.000.

Asai, Yoshiro, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Electromagnetic valve. 4,875,658, Cl. 129.21-.

Asato, Goro; and Tamura, Susan Y., to American Cyanamid Company. Mono- and diepoxide derivatives of LL-F28249 compounds. 4,876,272, Cl. 514-450.000.

Aschwanden, Werner; Imhof, Rene ; Jakob, Roland; and Kyburz, Emilio, to Hoffmann-La Roche Inc. Benzazecine derivatives for cognitive and memory functions. 4,876,340, Cl. 540-461.000.

Ashby, Robert E.; and Greig, Walter G., to Moore Business Forms, Inc. Continuous form with releasable label. 4,876,131, Cl. 428-42.000.

Ashimi, Tokuji: *See—*
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.

Ashland Oil, Inc.: *See—*
Shriver, H. Randall; Dunnavant, William R.; and Gruber, Bruce A., 4,876,294, Cl. 523-139.000.

Asonen, Harry: *See—*
Pessa, Markus; Asonen, Harry; Varrio, Jukka; and Salokatve, Arto, 4,876,218, Cl. 437-107.000.

AT&T Information Systems: *See—*
Barron, Salvador; and Coffman, James E., 4,876,717, Cl. 380-25.000.

Atlantic Richfield Company: *See—*
Airhart, Tom P., 4,875,544, Cl. 181-113.000.
Leyshon, David W.; and Bader, Robert A., 4,876,409, Cl. 585-500.000.
Mana, Michael L., 4,875,525, Cl. 166-280.000.
Montgomery, Melvin G., 4,876,450, Cl. 250-261.000.
Petermann, Steven G.; and Schasteen, Thomas, 4,876,672, Cl. 367-35.000.
Taylor, James M.; and Karner, Gary M., 4,875,398, Cl. 83-100.000.

Atochem: *See—*
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased, 4,875,909, Cl. 55-40.000.

Atomic Skifabrik Alois Rohrmoser: *See—*
Scherubl, Franz, 4,875,702, Cl. 280-602.000.

Aubert, Guy, to Thomson-CGR. Method of measuring the intensity of a DC current and a device implementing this method. 4,876,503, Cl. 324-117.00R.

Ausimont S.p.A.: *See—*
Gervasutti, Claudio, 4,876,405, Cl. 570-156.000.

Austruy, Georges: *See—*
Cagnon, Francois; Di Paola, Denis; Austruy, Georges; and Vinchon, Andre , 4,875,850, Cl. 431-8.000.

Autant, Pierre; Cartillier, Andre; and Pigeon, Raymond, to Rhone-Poulenc Sante. Compositions for coating feeding stuff additives intended for ruminants and feeding stuff additives thus coated. 4,876,097, Cl. 426-74.000.

Autokraft Limited: *See—*
Parker, Robert H., 4,875,535, Cl. 180-6.200.

Automobiles Citroen: *See—*
Chaintreuil, Rene, 4,875,250, Cl. 16-4.000.

Automobiles Peugeot: *See—*
Chaintreuil, Rene, 4,875,250, Cl. 16-4.000.

Auvil, Steven R.: *See—*
Agrawal, Rakesh; Auvil, Steven R.; and Deeba, Michel, 4,876,377, Cl. 558-416.000.

Avakian, Roger W.: *See—*
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,876,309, Cl. 524-109.000.

Avar, Lajos, to Sandoz Ltd. Oxalanilides useful as U.V. absorbers. 4,876,299, Cl. 524-99.000.

B.A.S.F. Peintures & Encres S.A.: *See—*
Guyomard, Daniel; Torrez, Gerald; Lambour, Jean-Michel; and Arriveau, Claude, 4,876,111, Cl. 427-31.000.

B. F. Goodrich Company, The: *See—*
Adams, Lowell J.; Simshauser, Steven C.; Pisarski, Nathan; and Weisend, Norbert A., Jr., 4,875,644, Cl. 244-134.00R.
Mazany, Anthony M., 4,876,305, Cl. 524-401.000.
Phillips, Ronald W., II, 4,875,815, Cl. 411-38.000.

Babcock, Walter C.; and Friesen, Dwayne T., to Bend Research, Inc. Selective ion-complexing media for the removal of metal-ion contaminants from plating baths. 4,876,287, Cl. 521-28.000.

Baca, Oswald G.: *See—*
Frazier, Marvin E.; Mallavia, Louis P.; Baca, Oswald G.; and Samuel, James E., 4,876,186, Cl. 435-6.000.

Baczyzmalski, Andrzej: *See—*
Niederhuefner, Detlev; Hahn, Guenter; and Baczyzmalski, Andrzej, 4,876,417, Cl. 200-48.00V.

Bader, Robert A.: *See—*
Leyshon, David W.; and Bader, Robert A., 4,876,409, Cl. 585-500.000.

Badger, Ronald L.; and Pejakovich, Michael, to United Steel & Wire Company. Child seat for over-the-counter shopping cart. 4,875,695, Cl. 280-33.993.

Badiali, Mario: *See—*
Shmidt, Iosif; and Badiali, Mario, 4,876,013, Cl. 210-650.000.

Baethmann, Hans-Juergen: *See—*
Gronsfeld, Josef; Jacobi, Hatto; and Baethmann, Hans-Juergen, 4,875,371, Cl. 73-598.000.

Baiel, James J.: *See—*
Cohen, Abraham D.; Diana, William D.; and Baiel, James J., 4,876,403, Cl. 568-913.000.

Bailey, John S.: *See—*
Tullis, Barclay J.; Bailey, John S.; Gunawardena, D. R.; and Kaempf, Ulrich, 4,875,825, Cl. 414-786.000.

Bailey, Linda F. Synthetic leather-like material. 4,876,138, Cl. 428-172.000.

Baines, Roger F.: *See—*
Wang, Patrick S.-C.; and Baines, Roger F., 4,876,474, Cl. 310-236.000.

Baker, Clifford E.: *See—*
Carlton, Dale E.; Baker, Clifford E.; and Henricksen, Ronald M., 4,876,655, Cl. 364-487.000.

Bakewell, Joseph J., to Dynamics Research Corporation. Method of fabricating a printhead. 4,875,281, Cl. 29-825.000.

Balcke-Durr Aktiengesellschaft: *See—*
Krips, Herbert; and Podhorsky, Miroslan, 4,875,270, Cl. 29-421.100.

Baldasarri, Mario: *See—*
Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 4,875,995, Cl. 208-152.000.
Baldwin, Donald C., to Gorge Technology, Inc. Sailboard construction. 4,875,424, Cl. 114-39.200.
Ball, David R.: *See—*
Orac, Thomas H.; Quandt, Herbert C.; and Ball, David R., 4,875,979, Cl. 201-5.000.
Ball, Edward R., to Boeing Company, The. Self-checking ohmmeter that checks for contact resistance of its probes. 4,876,515, Cl. 324-538.000.
Ballard, Wayne W.: *See—*
Evans, Walter R.; Remenicky, Joseph M.; Jasper, Thomas E.; and Ballard, Wayne W., 4,875,351, Cl. 70-271.000.
Ballinger, Kedric L.; and Dornbush, Robert A., Sr. Golf practice apparatus. 4,875,685, Cl. 273-195.00B.
Ballmer, Horst; and Grosskopf, Rudolf, to Zeiss Ikon AG. Method and apparatus for non-contacting information transmission. 4,876,535, Cl. 340-825.340.
Baltzer, Gary L.; Lynch, Brian; and O'Brien, William D., Jr., to American Telephone and Telegraph Company, AT&T Technologies, Inc. Methods of adjusting the configuration of optical substrates. 4,875,916, Cl. 65-2.000.
Banju, Masaru: *See—*
Taniguchi, Yuji; and Banju, Masaru, 4,876,481, Cl. 313-502.000.
Banno, Masahiko; and Nakazato, Yasushi, to Ricoh Company, Ltd. Image forming system. 4,876,606, Cl. 358-434.000.
Barabino, William A.: *See—*
Chickering, Robert; and Barabino, William A., 4,875,602, Cl. 222-187.000.
Barbero, Mario, to Fiat Auto S.p.A. Window for a motor vehicle door. 4,875,307, Cl. 49-374.000.
Barbier, Alain; Breliere, Jean-Claude; and Garcia, Georges, to Sanofi. Methlenediphosphonic acid derivatives, and antirheumatic pharmaceutical composition in which they are present and methods of using same. 4,876,247, Cl. 514-89.000.
Bard, Steven: *See—*
Jones, Jack A.; Wen, Liang-Chi; and Bard, Steven, 4,875,346, Cl. 62-467.000.
Bardos, Gary M., to Recycling Systems, Inc. Wear protection chipper disc. 4,875,631, Cl. 241-92.000.
Barito, Thomas R.: *See—*
Johnson, William C.; Richardson, Hubert, Jr.; and Barito, Thomas R., 4,875,840, Cl. 418-55.000.
Baritz, Michael L.: *See—*
Anderson, Robert E.; and Baritz, Michael L., 4,875,257, Cl. 24-90.00B.
Barkans, Anthony C., to Schlumberger Technology Corporation. Method and apparatus for removing an image from a window of a display. 4,876,533, Cl. 340-721.000.
Barkatt, Aaron, to Macedo, Pedro B.; and Litovitz, Theodore A. Supported heteropolycyclic compounds in the separation and removal of late transition metals. 4,876,232, Cl. 502-417.000.
Barman, Rolf. Process for producing a toothbrush and a toothbrush blank for use in the process. 4,876,157, Cl. 428-542.800.
Barner, Richard; and Hubscher, Josef, to Hoffmann-La Roche Inc. Process for synthesizing chromanes. 4,876,369, Cl. 549-411.000.
Barnett, Allen M.; and Zolper, John C., to University of Delaware, The. Solution growth of lattice mismatched and solubility mismatched heterostructures. 4,876,210, Cl. 437-5.000.
Barrett, John P.: *See—*
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.
Barrett, Joseph B. Pants construction and associated method. 4,875,240, Cl. 2-227.000.
Barron, Salvador; and Coffman, James E., to American Telephone and Telegraph Company; and AT&T Information Systems. Adjunct processor for providing computer facility access protection via call transfer. 4,876,717, Cl. 380-25.000.
Bartmann, Martin, to Huls Aktiengesellschaft. Hydrocarbon resin/-polyphenylene ether comblike polymers, methods of producing these polymers, and their mixtures with polyphenylene ethers. 4,876,310, Cl. 525-149.000.
Barton, John W.: *See—*
Smith, Gilbert W.; Daniel, Mervyn F.; Barton, John W.; and Ratcliffe, Norman M., 4,876,150, Cl. 428-411.100.
Baruffaldi S.p.A.: *See—*
Depoli, Erminio, 4,875,565, Cl. 192-48.200.
Barzuza, Ytshak, to Filtration Water Filters For Agriculture and Industry, Ltd. Apparatus for cleaning corrugated filter elements. 4,875,913, Cl. 55-294.000.
Barzynski, Helmut: *See—*
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.
BASF Aktiengesellschaft: *See—*
Daltrozzo, Ewald; and Sulger, Werner, 4,876,347, Cl. 546-176.000.
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, 4,876,275, Cl. 514-452.000.
Schlag, Johannes; Koehnlein, Ernst; Bauer, Peter; Koessler, Ludwig; and Hausz, Alfred F., 4,876,147, Cl. 428-379.000.
Wallbillich, Guenter, 4,876,118, Cl. 427-142.000.
BASF Corporation: *See—*
Thorfinnson, Bradley S., 4,876,153, Cl. 428-447.000.
Bast, Ulrich; and Wersing, Wolfram, to Siemens Aktiengesellschaft. Method for manufacturing ceramic material having piezo-electric properties. 4,876,179, Cl. 430-320.000.
Bastien, Jean-Paul: *See—*
Boisson, Jean-Yves; and Bastien, Jean-Paul, 4,876,698, Cl. 375-25.000.
Battelle Development Corporation: *See—*
Benton, Ben F.; and Gardner, David L., 4,876,094, Cl. 424-491.000.
Frazier, Marvin E.; Mallavis, Louis P.; Baca, Oswald G.; and Samuel, James E., 4,876,186, Cl. 435-6.000.
Batten, Ronald W. Releasable high torque fastener. 4,875,266, Cl. 29-263.000.
Batty, Alan K.: *See—*
Moller, Ronald H.; and Batty, Alan K., 4,875,657, Cl. 249-86.000.
Bauer, Alfred: *See—*
Frantz, Leo R.; Bauer, Alfred; Koran, Matthew H.; and Becker, Jack, 4,876,416, Cl. 200-11.00R.
Bauer, Bernhard; and Dobhan, Herbert. Bearing bushing for universal joint pins. 4,875,787, Cl. 384-548.000.
Bauer, Frank I.; Mavretish, Robert S.; Shogan, Regis P.; and Sejvar, James, to Westinghouse Electric Corp. Temporary hot cell and related method for handling high radiation level sources. 4,876,593, Cl. 358-100.000.
Bauer, Peter: *See—*
Schlag, Johannes; Koehnlein, Ernst; Bauer, Peter; Koessler, Ludwig; and Hausz, Alfred F., 4,876,147, Cl. 428-379.000.
Baxter International Inc.: *See—*
Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., 4,876,066, Cl. 422-46.000.
Bayer Aktiengesellschaft: *See—*
Dziurla, Heinz-Jurgen; Freitag, Dieter; Waldenrath, Werner; Burkhardt, Claus; and Schulte, Bernhard, 4,876,033, Cl. 252-511.000.
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, 4,876,255, Cl. 514-252.000.
Fuhrer, Wolfgand; Kuhle, Engelbert; Adler, Alfons; and Hanssler, Gerd, 4,876,253, Cl. 514-241.000.
Heine, Hans-Georg; and Ooms, Pieter, 4,876,393, Cl. 568-415.000.
Kraatz, Udo, 4,876,353, Cl. 548-262.000.
Noll, Klaus; Thoma, Wilhelm; Nachtkamp, Klaus; Schroer, Walter; and Pedain, Josef, 4,876,302, Cl. 524-267.000.
Onnenberg, Volker; and Mollmann, Gunter, 4,875,843, Cl. 425-4.00R.
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.
Bayne, Marvin L.: *See—*
Applebaum, Joy D.; Bayne, Marvin L.; and Cascieri, Margaret A., 4,876,242, Cl. 514-3.000.
Bays, David E.: *See—*
Butina, Darko; Dowle, Michael D.; Bays, David E.; and Webb, Colin F., 4,876,267, Cl. 514-415.000.
BBC Brown Boveri AG: *See—*
Geller, Marius, 4,876,470, Cl. 310-59.000.
Kloucek, Franz; Larsson, Per-Olof; and Vogt, Ernst, 4,875,613, Cl. 228-44.300.
Beach, David E., to Eastman Kodak Company. Film cassette. 4,875,637, Cl. 242-71.100.
Beasom, James D.: *See—*
Davis, Christopher K.; and Beasom, James D., 4,876,579, Cl. 357-22.000.
Becker, Anton; and Kramer, Felix, to Elpatronic AG. Stepping drive. 4,875,382, Cl. 74-84.00R.
Becker, Jack: *See—*
Frantz, Leo R.; Bauer, Alfred; Koran, Matthew H.; and Becker, Jack, 4,876,416, Cl. 200-11.00R.
Beckett, David. Tool. 4,875,855, Cl. 433-3.000.
Becton Dickinson & Company: *See—*
Recktenwald, Diether J., 4,876,190, Cl. 435-7.000.
Bedard, Donna L.; and Brennan, Michael J., Jr., to General Electric Company. Method for biodegrading PCBS. 4,876,201, Cl. 435-262.000.
Bedekovic, Davor: *See—*
Phaff, Rox; and Bedekovic, Davor, 4,876,357, Cl. 548-463.000.
Beecham Group p.l.c.: *See—*
Dowrick, John S., 4,876,086, Cl. 424-80.000.
Beitelia, Ray R.: *See—*
Messner, Kirsten L.; Abrahms, Robert M.; and Beitelia, Ray R., 4,875,489, Cl. 128-772.000.
Belani, Jagdish: *See—*
Hilton, Robert; Emamjomeh, Ali; and Belani, Jagdish, 4,876,587, Cl. 357-70.000.
Belke, Robert E.; Zakraysek, Louis; and Pillar, Walter O., to General Electric Company. Tailorable multi-layer printed wiring boards of controlled coefficient of thermal expansion. 4,876,120, Cl. 428-1.000.
Bell, Mark: *See—*
Morgan, Leonard J.; and Bell, Mark, 4,875,929, Cl. 71-121.000.

Beloit Corporation: *See—*
Wedel, Gregory L., 4,875,976, Cl. 162-306.000.

Beltone Electronics Corporation: *See—*
Anderson, James R.; and Brander, Richard, 4,876,499, Cl. 323-312.000.

Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., to Vsesojuzny Nauchno-Issledovatelsky I Ispytatelny Institut Meditsinskoi Tekhniki. Sutural material. 4,875,479, Cl. 128-335.500.

Bend Research, Inc.: *See—*
Babcock, Walter C.; and Friesen, Dwayne T., 4,876,287, Cl. 521-28.000.
McCray, Scott B., 4,876,009, Cl. 210-500.330.

Bender, Reinhold H. W.: *See—*
Musser, John H.; Kreft, Anthony F., III; and Bender, Reinhold H. W., 4,876,346, Cl. 546-172.000.

Bender, Robert: *See—*
Duck, Peter; Bender, Robert; Crosby, William; and Robertson, John G., 4,876,187, Cl. 435-6.000.

Bender, Stanley I.; Butler, Lawrence; and Dawes, Peter W., to General Electric Company. Vibration isolating engine mount. 4,875,655, Cl. 248-557.000.

Bendig, Robert, Jr. Support stand. 4,875,649, Cl. 248-153.000.

Benford, Howard L.: *See—*
Leising, Maurice B.; Benford, Howard L.; and Holbrook, Gerald L., 4,875,391, Cl. 74-866.000.

Benilan, Jacques. Orientable platform, in particular for training in golf. 4,875,684, Cl. 273-195.00B.

Benn, Gerald; Farrar, David; and Flesher, Peter, to Allied Colloids Limited. Process for producing sulphonic acid. 4,876,047, Cl. 562-41.000.

Bennett, Robert E.: *See—*
Turner, Reed J.; Peters, Loren W.; Wilson, John E.; and Bennett, Robert E., 4,875,891, Cl. 460-110.000.

Benthack-Thoms, Heidi: *See—*
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.

Benton, Ben F.; and Gardner, David L., to Battelle Development Corporation. Controlled release liquid dosage formulation. 4,876,094, Cl. 424-491.000.

Berdichevsky, Boris, to Sloan Valve Co. Preset quick change tooling for a recess cutting attachment. 4,875,397, Cl. 82-60.000.

Berg, Olle. Means for assembling boards. 4,875,267, Cl. 29-281.300.

Berg, Skip. Disposable tooth cleaning & polishing apparatus. 4,875,247, Cl. 15-104.940.

Berger, Thomas R.: *See—*
Reed, John D.; Roberts, Teddy P.; and Berger, Thomas R., 4,876,710, Cl. 379-63.000.

Berglund, June M.: *See—*
Mayer, David W.; Gilman, Byron L.; Walgren, Susan M.; and Berglund, June M., 4,876,109, Cl. 427-2.000.

Berkeley Quartz Lab, Inc.: *See—*
Wagner, Edward A.; and Guiver, Harold C., 4,876,225, Cl. 437-248.000.

Berkhan, Dietmar; and Mehlert, Martin, to Otis Elevator Company. Safety brake for escalators. 4,875,558, Cl. 188-171.000.

Bernard, Patrice; Sauvage, Laurent; Girard, Henri; and Ferrero, Jean-Pierre, to Commissariat a L'Energie Atomique. Control process for a nuclear reactor. 4,876,057, Cl. 376-216.000.

Bernhardt, Bruno; and Kedzierski, Heinrich, to WABCO Westinghouse Steuerungstechnik GmbH. Sealing device. 4,875,405, Cl. 92-194.000.

Berol Kemi AB: *See—*
Hellsten, Martin, 4,876,122, Cl. 428-34.100.

Berthon, Patrick; and Guion, Christian, to Flonic. System for controlling metered parking. 4,876,540, Cl. 340-932.200.

Bessho, Yasunori: *See—*
Aoyama, Motoo; Bessho, Yasunori; Uchikawa, Sadao; Takeda, Renzo; and Ishii, Yoshihiko, 4,876,062, Cl. 376-444.000.

Best, Stuart J.; and Willard, Reginald A., to Thorn Emi plc. Signal identification. 4,876,617, Cl. 360-60.000.

Betteridge, Peter R.: *See—*
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,876,200, Cl. 435-253.300.

Bettger, Richard R.: *See—*
Smallegan, Jon M.; and Bettger, Richard R., 4,875,352, Cl. 70-395.000.

Betts, Peter; and Jahn, Darrell D., to Donaldson Company, Inc. Oil recovery apparatus. 4,876,011, Cl. 210-526.000.

Beucher, Josef, to GTE Sylvania Licht GmbH. Photocell, having inclined plate cathode. 4,876,443, Cl. 250-211.00R.

Bhattacharjee, Himangshu R.: *See—*
Khanna, Yash P.; Bhattacharjee, Himangshu R.; Kumar, Rakesh; Williams, Jon I.; and Sibilia, John P., 4,876,127, Cl. 428-35.700.

Bie, Paul R.: *See—*
Calviello, Joseph A.; Bie, Paul R.; and Pomian, Ronald J., 4,876,176, Cl. 430-311.000.

Biehl, Johann; and Ostertag, Alfred, to Eastman Christensen Company. Core drilling tool with direct drive. 4,875,531, Cl. 175-250.000.

Biggerstaff, Charles E.: *See—*
Campbell, Michael L.; Williams, Benjamin G.; Riffle, Rob G.; and Biggerstaff, Charles E., 4,876,051, Cl. 264-127.000.

Biltoft, Bruce G.: *See—*
Kopp, Clinton V.; Roberts, Dennis; Biltoft, Bruce G.; and White, Victor, 4,876,012, Cl. 210-644.000.

Bioderm, Inc.: *See—*
Alvarez, Oscar M., 4,875,473, Cl. 128-155.000.

Biomet, Inc.: *See—*
Border, Robert, 4,875,474, Cl. 128-92.00Y.

Biorne Enterprises, Inc.: *See—*
Moe, Rolf; Corriea, David J.; and Premeau, John E., 4,875,824, Cl. 414-751.000.

Bipolar Integrated Technology, Inc.: *See—*
Owen, Robert E.; and Miller, Bruce E., 4,876,660, Cl. 364-754.000.

Birkmann, Rolf: *See—*
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.

Bito, Hiroyasu: *See—*
Hara, Kazuya; Inoue, Takanori; and Bito, Hiroyasu, 4,876,441, Cl. 235-488.000.

Bittorf, Bradley J.; Flood, Mark A.; Kalan, Michael D.; and Sepsi, Robert R., to Allen-Bradley Company, Inc. Programmable controller with a dual intermodule message system. 4,876,664, Cl. 364-900.000.

Bjorck, Lars; Erntell, Mats; and Myhre, Erling, to Hightech Receptor AB. Protein L and subfragments thereof, with immunoglobulin binding activity, a process for preparing thereof, reagent kit, pharmaceutical composition and a *peptococcus magnus* strain. 4,876,194, Cl. 435-68.000.

Bjornard, Eric: *See—*
Ross, Randall R.; Bjornard, Eric; and Strand, David, 4,876,667, Cl. 365-113.000.

Black Clawson Company, The: *See—*
Creagan, Richard W.; and Nicol, Alan J., 4,875,977, Cl. 162-300.000.

Black & Decker Inc.: *See—*
Bunyea, Roderick F.; and Zurwelle, Donald W., 4,875,879, Cl. 439-501.000.

Black & Webster, Inc.: *See—*
Livingston, Douglas J., 4,876,431, Cl. 219-110.000.

Blackmon, Kenneth P.; Clagett, Donald C.; Fox, Daniel W.; Maresca, Louis M.; and Shafer, Sheldon J., to General Electric Company. Amide-urea copolymer and process for the preparation thereof. 4,876,317, Cl. 525-433.000.

Blake, Barry C.; and Clarke, David J., to Public Health Laboratory Service Board. Apparatus for investigating the condition of a bacteria containing suspension through frequency profile of electrical admittance. 4,876,504, Cl. 324-204.000.

Blanch, G. Marsden, to American Medical Products, Inc. Electrosurgical knife. 4,876,110, Cl. 427-2.000.

Blazey, Steven D.: *See—*
Hoyt, John M.; and Blazey, Steven D., 4,876,315, Cl. 525-346.000.

Bleke, Jeffrey P.: *See—*
Hay, George H.; and Bleke, Jeffrey P., 4,875,420, Cl. 110-215.000.

Blum, Helmut; and Hemmann, Siglinde, to Henkel Kommanditgesellschaft auf Aktien. Process for synthesis of azacycloalkane-2,2-diphosponic acids. 4,876,339, Cl. 540-450.000.

Blumer, Eric W.: *See—*
Rando, Joseph F.; and Blumer, Eric W., 4,876,691, Cl. 372-65.000.

BMI, Inc.: *See—*
Head, James D.; Burns, Edward F.; Schleizer, William A.; White, C. Douglas; and Gentry, Dennis L., 4,875,662, Cl. 266-44.000.

Boardman, Peter W.; and McCombs, Daniel G., to Deere & Company. Material fabricating mechanism. 4,875,356, Cl. 72-321.000.

Bobkov, Jury G.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Bockmann, Klaus: *See—*
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.

Boede, Robert H., to Brunswick Corporation. Stowable pull handle for electric trolling motor support apparatus. 4,875,656, Cl. 248-642.000.

Boehringer Mannheim GmbH: *See—*
Deneke, Ulfert; Nagel, Rolf; Rothe, Anselm; and Freitag, Helmut, 4,876,067, Cl. 422-56.000.
Schetters, Hartmut; Endl, Josef; and Albert, Winfried, 4,876,189, Cl. 435-7.000.

Boeing Company, The: *See—*
Ball, Edward R., 4,876,515, Cl. 324-538.000.
Connor, Michael J., 4,875,692, Cl. 277-212.0FB.
Courter, Jack P., 4,875,645, Cl. 244-137.100.
Gentile, Geoffrey E., 4,876,488, Cl. 315-378.000.
Gilbert, Dennis H., 4,875,372, Cl. /3-614.000.
Lubowitz, Hyman R.; and Sheppard, Clyde H., 4,876,328, Cl. 528-322.000.
Pinson, George T., 4,875,374, Cl. 73-663.000.

Bogorad, Alexander: *See—*
Herschitz, Roman; Bogorad, Alexander; and Harhigh, Robert N., 4,876,430, Cl. 219-110.000.

Bohnen, Bruce A.: *See—*
Heikkila, Kurt E.; Williams, Rodney K.; and Bohnen, Bruce A., 4,875,973, Cl. 156-664.000.
Williams, Rodney K.; Bohnen, Bruce A.; and Heikkila, Kurt E., 4,875,972, Cl. 156-664.000.

Boilen, Kenneth T. Connection system for preventing uplift of shear walls. 4,875,314, Cl. 52-167.00R.

Boisson, Jean-Yves; and Bastien, Jean-Paul, to Telecommunications Radioelectriques et Telephoniques. System for transmitting sequences of digital samples encoded by variable-length binary words. 4,876,698, Cl. 375-25.000.

Bonin, Jacqueline L.: *See—*
Gross, Anthony E.; and Bonin, Jacqueline L., 4,875,935, Cl. 75-117.000.

Booty, Donald J., Jr.: *See—*
Booty, Donald J., Sr.; and Booty, Donald J., Jr., 4,875,871, Cl. 439-209.000.

Booty, Donald J., Sr.; and Booty, Donald J., Jr., to National Service Industries, Inc. Modular electrical conductor system. 4,875,871, Cl. 439-209.000.

Border, Robert, to Biomet, Inc. Variable wall thickness interlocking intramedullary nail. 4,875,474, Cl. 128-92.00Y.

Bores, Pedro S. Quadrangular stepped mosaic breakwater. 4,875,804, Cl. 405-31.000.

Borg-Warner Automotive GmbH: *See—*
Leitz, Hermann; Krayer, Erich; and Kohler, Rudolf, 4,875,564, Cl. 192-45.100.

Borg-Warner Automotive, Inc.: *See—*
Schneider, Karl F.; Haley, William J.; and Miller, Alan L., 4,875,561, Cl. 192-0.033.

Borg-Warner Corporation: *See—*
Fox, Clarence D., 4,875,499, Cl. 137-82.000.

Borgos, John A.; Bradac, Francis; Haumschild, Daniel J.; Johnson, Timothy; and Lee, Rebecca, to TSI Incorporated. Fiber optic connector assembly and method of making same. 4,875,755, Cl. 350-96.200.

Borkowicz, Jerzy, to Northern Telecom Limited. Protection devices and arrangements for telephone lines. 4,876,620, Cl. 361-56.000.

Bornstein, Jonathan G., to Domain Technology. Method and coating transition metal oxide on thin film magnetic disks. 4,876,117, Cl. 427-130.000.

Boro, John R.: *See—*
Dobosz, Ronald F., 4,875,431, Cl. 116-173.000.

Boron, Joseph J., to Midwest Instrument Co., Inc. Corrugated jacket for molten metal sampler. 4,875,380, Cl. 73-864.580.

Bose, Chinmoy B., to American Telephone and Telegraph Company. Method and apparatus for differentiating a planar textured surface from a surrounding background. 4,876,457, Cl. 250-563.000.

Bosse, Gerhard R.; Lienow, Michael; Spiegel, Bernt; and Kruse, Bernd O. Oil squirt with wall holder. 4,875,652, Cl. 248-311.200.

Bouvot, Jean F., to VALEO. Device of the crank connecting rod type, in particular for controlling a ventilation louver in an automobile heating or air conditioning unit. 4,875,388, Cl. 74-579.00R.

Bowes, Emmerson; Chang, Clarence D.; Han, Scott; and Shihabi, David S., to Mobil Oil Corporation. Modified crystalline aluminosilicate zeolite catalyst and its use in the production of lubes of high viscosity index. 4,876,411, Cl. 585-533.000.

Bowles, Thomas J.: *See—*
Miller, J. Stanley; and Bowles, Thomas J., 4,876,296, Cl. 523-200.000.

Bowley, Heather J.; and Gerrard, Donald L., to British Petroleum Company p.l.c., The. Method for assessing diamond quality. 4,875,771, Cl. 356-30.000.

Bownass, Audrey J.: *See—*
Robinson, Colin; Eastlick, David T.; and Bownass, Audrey J., 4,876,351, Cl. 548-204.000.

Boyd, Donald R., to Siemens Energy & Automation, Inc. Tripping coil with flux shifting coil and booster coil. 4,876,521, Cl. 335-179.000.

Boynton, Nancy V. Swim suit construction. 4,875,236, Cl. 2-67.000.

BP Chemicals Limited: *See—*
O'Connor, Sean P., 4,876,021, Cl. 252-48.200.

Brackett, Tom S., to Integrated Fluidics, Inc. Method of bonding plastics. 4,875,956, Cl. 156-84.000.

Bradac, Francis: *See—*
Borgos, John A.; Bradac, Francis; Haumschild, Daniel J.; Johnson, Timothy; and Lee, Rebecca, 4,875,755, Cl. 350-96.200.

Bradfute, John G.: *See—*
Lulham, Cedric M.; Wofford, George D.; Bradfute, John G.; and Friedrich, Steven G., 4,875,587, Cl. 206-484.000.

Bradley, Billie J.; Giroux, Richard L.; and Joyce, Allen T., to Halliburton Company. Casing centralizer. 4,875,524, Cl. 166-241.000.

Brambilla, Silvio, to SICAM S.p.A. Method for the production of motor vehicle seats and seats obtained by this method. 4,875,736, Cl. 297-440.000.

Bramley, Jenny, to United States of America, Army. Microwave-pumped atomic gas laser. 4,876,692, Cl. 372-70.000.

Brandemuehl, Michael J.; and Reason, John R., to Carrier Corporation. Control apparatus for refrigerated cargo container. 4,875,341, Cl. 62-115.000.

Brander, Richard: *See—*
Anderson, James R.; and Brander, Richard, 4,876,499, Cl. 323-312.000.

Brandes, Wilhelm: *See—*
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.

Brandl, Erich: *See—*
Zitz, Alfred; and Brandl, Erich, 4,875,738, Cl. 299-80.000.

Braun, Robert J.: *See—*
Mertz, William J.; and Braun, Robert J., 4,876,304, Cl. 524-314.000.

Braye, Emile: *See—*
Radisson, Joel; and Braye, Emile, 4,876,362, Cl. 549-59.000.

Breakspear, Colin J., to Westland Group plc. Method for laying a sheet of material on a surface. 4,875,962, Cl. 156-245.000.

Breitzke, Willi; and Hensen, Hermann, to Henkel Kommanditgesellschaft auf Aktien. Aqueous preparations of sodium lauryl sulfate and myristyl sulfate having a low cloud point useful in making toothpastes. 4,876,035, Cl. 252-550.000.

Breliere, Jean C.; Emonds-Alt, Xavier; and Garcia, Georges, to Sanofi. Anti-inflammatory products derived from methylene-diphosphonic acid, and process for their preparation. 4,876,248, Cl. 514-108.000.

Breliere, Jean-Claude: *See—*
Barbier, Alain; Breliere, Jean-Claude; and Garcia, Georges, 4,876,247, Cl. 514-89.000.

Brennan, Michael J., Jr.: *See—*
Bedard, Donna L.; and Brennan, Michael J., Jr., 4,876,201, Cl. 435-262.000.

Brewer Science, Inc.: *See—*
Brewer, Terry L.; Hawley, Dan W.; Lamb, James E.; Latham, William J.; and Stichnote, Lynn K., 4,876,165, Cl. 430-7.000.

Brewer, Terry L.; Hawley, Dan W.; Lamb, James E.; Latham, William J.; and Stichnote, Lynn K., to Brewer Science, Inc. Light filters for microelectronics. 4,876,165, Cl. 430-7.000.

Bridges, John O. Slowly dissolving fishing lure attachment with scent mixture. 4,875,305, Cl. 43-42.060.

Bridgestone Corporation: *See—*
Kumagai, Yuzo, 4,875,959, Cl. 156-123.000.

Briggs & Stratton Corporation: *See—*
Dykstra, Richard A., 4,875,448, Cl. 123-352.000.

Brilmyer, George H.; and Tiedemann, William H., to Globe-Union Inc. Dynamic state-of-charge indicator for a battery and method thereof. 4,876,513, Cl. 324-427.000.

Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., to Baxter International Inc. Integrated membrane oxygenator, heat exchanger and reservoir. 4,876,066, Cl. 422-46.000.

Brint, Gary T.; Bungardt, Gabriele; Gedecke, Jerel C.; Harris, Robert L.; and Kraz, Vladimir, to Electronics, Inc. Programmable telephone amplifier circuit interface. 4,876,712, Cl. 379-387.000.

Brintec Corporation: *See—*
Archer, Lee A.; and Brownell, Kenneth W., Jr., 4,875,875, Cl. 439-401.000.

Bristol Compressors, Inc.: *See—*
Stringer, Hugh C.; and Montgomery, Larry D., 4,875,580, Cl. 206-319.000.

British Aerospace plc: *See—*
Taylor, Clive R., 4,876,584, Cl. 357-23.130.

British Aerospace Public Limited Company: *See—*
Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Matthews, Brian; and Peters, Michaels S., 4,875,646, Cl. 244-190.000.

British Petroleum Company p.l.c., The: *See—*
Bowley, Heather J.; and Gerrard, Donald L., 4,875,771, Cl. 356-30.000.

British United Shoe Machinery Limited: *See—*
Hanson, Raymond; Tillyard, Malcolm; and Allen, Christopher M., 4,876,434, Cl. 219-215.000.

Britt, Ronald H., to Lundy ELectronics & Systems, Inc. Optical character reader with skew recognition. 4,876,730, Cl. 382-37.000.

Brizzi, Marco: *See—*
Gamberini, Antonio; and Brizzi, Marco, 4,875,325, Cl. 53-137.000.

Broadhead, Douglas G.: *See—*
Hodgson, Gordon; Broadhead, Douglas G.; and Parent, David J., 4,875,538, Cl. 180-379.000.

Brock, Alan J.: *See—*
Taylor, Reginald M.; and Brock, Alan J., 4,876,278, Cl. 514-494.000.

Bronner, Wolfgang: *See—*
Saur, Niko K.; and Bronner, Wolfgang, 4,875,536, Cl. 180-6.320.

Broo, Richard F.: *See—*
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.

Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, to Innovative Medical Engineering, Inc. Continuous passive motion devices and methods. 4,875,469, Cl. 128-26.000.

Brors, Kenneth A., to Air Powder Systems. Particle pulverizer injection nozzle. 4,875,629, Cl. 241-39.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Karube, Yoshiyuki; Hayakawa, Toshimasa; and Yoshida, Yasunari, 4,875,790, Cl. 400-605.000.

Broussard, Jerry A.; Fuqua, Wayne C.; and George, James H., to Hoechst Celanese Corporation. Production of monohydroxy monocyclic acetals and their esters. 4,876,368, Cl. 549-374.000.

Browder, George A. G., Jr.; and Grant, David W., to Esmark Apparel, Inc. Pantyhose with panty having cotton characteristics. 4,875,241, Cl. 2-409.000.

Brown, Stephen D.; Junker, Warren R.; and Gradich, Francis X., to Westinghouse Electric Corp. Apparatus and method for inspecting the profile of the inner wall of a tube employing a wall follower and an eddy current probe. 4,876,506, Cl. 324-220.000.

Brownell, Kenneth W., Jr.: *See—*
Archer, Lee A.; and Brownell, Kenneth W., Jr., 4,875,875, Cl. 439-401.000.

Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Matthews, Brian; and Peters, Michaels S., to British Aerospace Public Limited Company. Aircraft navigation systems. 4,875,646, Cl. 244-190.000.

Brubaker, Weldon L.: *See—*
Finney, James E.; and Brubaker, Weldon L., 4,875,582, Cl. 206-330.000.

Bruen, Johannes; and Latussek, Hans-Peter, to Siemens Aktiengesellschaft. Backplane with associated handling means. 4,875,869, Cl. 439-189.000.

Brunette, Jean-Pierre: *See—*
Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, 4,876,036, Cl. 252-637.000.

Brunswick Corporation: *See—*
Boede, Robert H., 4,875,656, Cl. 248-642.000.
Donahue, Raymond J.; Cleary, Terrance M.; Hauenstein, Frederick M.; and Marcellis, Daniel H., 4,875,517, Cl. 164-34.000.
Donahue, Raymond J.; Hesterberg, William G.; and Cleary, Terrance M., 4,875,985, Cl. 204-64.00T.
Fitzner, Arthur O., 4,875,457, Cl. 123-633.000.
Meisenburg, Gary L., 4,875,884, Cl. 440-88.000.
Slattery, Gordon C., 4,875,883, Cl. 440-77.000.
Widmer, Steven L.; Neisen, Gerald F.; Ruhnke, Jeffrey P.; Steffes, Thomas J.; and Buchholz, Brian S., 4,875,439, Cl. 123-541.000.

Brustle, Klaus: *See—*
Rock, Erich; and Brustle, Klaus, 4,875,746, Cl. 312-330.100.

Buchanan, Michael E.: *See—*
Kerr, Howard T.; Buchanan, Michael E.; and Valentine, Kenneth H., 4,876,721, Cl. 358-56.000.

Buchel, Karl H.: *See—*
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.

Buchholz, Brian S.: *See—*
Widmer, Steven L.; Neisen, Gerald F.; Ruhnke, Jeffrey P.; Steffes, Thomas J.; and Buchholz, Brian S., 4,875,439, Cl. 123-541.000.

Buchler B-Set AG: *See—*
Buchler, Rene , 4,876,429, Cl. 219-69.150.

Buchler, Rene , to Buchler B-Set AG. Device for retaining tools or workpieces having a cylindrical shaft. 4,876,429, Cl. 219-69.150.

Bucking, Wolfram: *See—*
Kubein-Messenburg, Dietmar; Meyer, Georg; and Bucking, Wolfram, 4,875,857, Cl. 433-56.000.

Buckingham Manufacturing Company, Inc.: *See—*
Rullo, James J., 4,875,550, Cl. 182-221.000.

Buckland, Paul R., to Eastman Kodak COmpany. Photographic elements containing pyrazolone color couplers. 4,876,182, Cl. 430-555.000.

Budde, Klaus; Koch, Friedrich; and Quella, Ferdinand, to Siemens Aktiengesselschaft. Irradiation cross-linkable thermostable polymer system, for microelectronic applications. 4,876,322, Cl. 526-242.000.

Buell Industries, Inc.: *See—*
Peterson, Francis C., 4,875,816, Cl. 411-104.000.

Buhler, James E.; Crapser, James R.; Miller, Allen D.; and Wefler, Mark E., to S. C. Johnson & Son, Inc. Piston-powered dispensing system. 4,875,626, Cl. 239-314.000.

Bulanda, John J.: *See—*
Caveny, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 4,875,881, Cl. 439-535.000.

Bungardt, Gabriele: *See—*
Brint, Gary T.; Bungardt, Gabriele; Gedecke, Jerel C.; Harris, Robert L.; and Kraz, Vladimir, 4,876,712, Cl. 379-387.000.

Buntrock, Robert E.: *See—*
Cebalo, Tony; and Buntrock, Robert E., 4,876,044, Cl. 71-90.000.

Bunyea, Roderick F.; and Zurwelle, Donald W., to Black & Decker Inc. Cord retainer for a portable electric tool. 4,875,879, Cl. 439-501.000.

Burgess, Peter H., to National Radiological Protection Board. Radiation detector. 4,876,454, Cl. 250-370.140.

Burggraf, Peter: *See—*
Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Burggraf, Peter, 4,875,406, Cl. 98-2.010.

Burke, Basil A.; and Nair, Muraleedharan G., to Plant Cell Research Institute, Inc. Antimicrobial/antifungal compositions. 4,876,277, Cl. 514-465.000.

Burke, Rae Lyn; Rosenberg, Steven; Shuster, Jeffrey R.; Tekamp-Olson, Patricia A.; and Valenzuela, Pablo D. T., to Chiron Corporation. Eukaryotic regulatable transcription. 4,876,197, Cl. 435-172.300.

Burke, Robert W., II; Cahen, Albert J., Jr.; Credle, William S., Jr.; Gupta, Ashis S.; and Heenan, Richard H., to Coca-Cola Company, The. Beverage container suitable for use in outer space. 4,875,508, Cl. 141-2.000.

Burke, Steven R.: *See—*
Albrecht, Leonard N.; and Burke, Steven R., 4,875,242, Cl. 4-243.000.

Burkhardt, Claus: *See—*
Dziurla, Heinz-Jurgen; Freitag, Dieter; Waldenrath, Werner; Burkhardt, Claus; and Schulte, Bernhard, 4,876,033, Cl. 252-511.000.

Burnand, Richard P.: *See—*
Phaal, Cornelius; and Burnand, Richard P., 4,875,907, Cl. 51-293.000.

Burns, Edward F.: *See—*
Head, James D.; Burns, Edward F.; Schleizer, William A.; White, C. Douglas; and Gentry, Dennis L., 4,875,662, Cl. 266-44.000.

Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, to Milton Roy Company. Optical system for a multidetector array spectrograph. 4,875,773, Cl. 356-328.000.

Burrington, James D.: *See—*
DiCosimo, Robert; Burrington, James D.; and Suresh, Dev D., 4,876,348, Cl. 546-252.000.

Butina, Darko; Dowle, Michael D.; Bays, David E.; and Webb, Colin F., to Glaxo Group Limited. 5-Aminosulphoryl substituted indole derivatives. 4,876,267, Cl. 514-415.000.

Butler, Jerry F.: *See—*
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.

Butler, Lawrence: *See—*
Bender, Stanley I.; Butler, Lawrence; and Dawes, Peter W., 4,875,655, Cl. 248-557.000.

Buxton, Clifford A.: *See—*
Leone, David A.; Buxton, Clifford A.; and Robbins, W. Dale, 4,876,424, Cl. 200-306.000.

Byerley, Thomas J.: *See—*
Engel, James F.; Byerley, Thomas J.; and Christie, Howard W., 4,876,323, Cl. 526-310.000.

Byers, Gary W.; and Chapman, Derek D., to Eastman Kodak Company. Thermally-transferable fluorescent 7-aminocoumarins. 4,876,237, Cl. 503-227.000.

Cachier, Gerard, to Thomson-CSF. Microwave switch having magnetically biased superconductive conductors. 4,876,239, Cl. 505-1.000.

Cagnon, Francois; Di Paola, Denis; Austruy, Georges; and Vinchon, Andre , to Gaz de France. Gas burner of the blown air and premixture type. 4,875,850, Cl. 431-8.000.

Cahen, Albert J., Jr.: *See—*
Burke, Robert W., II; Cahen, Albert J., Jr.; Credle, William S., Jr.; Gupta, Ashis S.; and Heenan, Richard H., 4,875,508, Cl. 141-2.000.

Cahill, Richard F.: *See—*
Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., 4,875,775, Cl. 356-350.000.

California Institute of Technology: *See—*
Thakoor, Anilkumar P.; Lambe, John; and Moopen, Alexander, 4,876,668, Cl. 365-163.000.

California Natural Products: *See—*
Mitchell, Cheryl R.; Mitchell, Pat R.; and Mitchell, William A., 4,876,096, Cl. 426-28.000.

Calviello, Joseph A.; Bie, Paul R.; and Pomian, Ronald J., to Eaton Corporation. Method for fabricating quasi-monolithic integrated circuits. 4,876,176, Cl. 430-311.000.

Cameron Iron Works USA, Inc.: *See—*
Thornburrow, Edward T., 4,875,523, Cl. 166-77.000.

Campana, Thomas J., Jr.: *See—*
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,876,538, Cl. 340-825.260.

Campbell, James F.: *See—*
Durney, Cronin Rebecca L.; Rutherford W. Scott; and Campbell, James F., 4,876,293, Cl. 523-122.000.

Campbell, Marvin J. Ground clamp for coaxial cable junction block. 4,875,864, Cl. 439-100.000.

Campbell, Michael L.; Williams, Benjamin G.; Riffle, Rob G.; and Biggerstaff, Charles E., to W. L. Gore & Associates, Inc. Apparatus and method for extruding and expanding polytetrafluoroethylene tubing and the products produced thereby. 4,876,051, Cl. 264-127.000.

Canada, Larry J., to Sekine Corporation. Brush device containing carrier media. 4,875,792, Cl. 401-283.000.

Canaud, Michel; and Dewitte, Philippe, to Saint-Gobain Vitrage. Pumping of high viscosity materials. 4,875,833, Cl. 417-259.000.

Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, to Societe Chimique des Charbonnages S.A. Process for the extraction of cations and application thereof to the treatment of aqueous effluents. 4,876,036, Cl. 252-637.000.

Canfield, Glenn. Method of deoxidizing molten ferrous metals. 4,875,934, Cl. 75-58.000.

Canon Kabushiki Kaisha: *See—*
Amikura, Takashi; Fujiwara, Akihiro; Toyama, Masamichi; Ueda, Kouichi; and Kozuki, Susumu, 4,876,564, Cl. 354-400.000.
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, 4,875,810, Cl. 406-14.000.
Hashimoto, Seiji; and Harada, Tadanori, 4,876,601, Cl. 358-213.260.
Honma, Toshio; and Watanabe, Nobuyuki, 4,876,612, Cl. 358-474.000.
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,876,042, Cl. 264-39.000.
Iwaya, Toshio, 4,876,570, Cl. 355-204.000.
Mamiya, Toshiharu, 4,876,558, Cl. 346-140.00R.
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,876,185, Cl. 430-580.000.
Nishikawa, Hiroshi, 4,876,559, Cl. 346-140.00R.
Nobuta, Hiroshi, 4,876,604, Cl. 358-400.000.
Ohsawa, Hidefumi; Katayama, Akihiro; Hosokawa, Hiroshi; Sunohara, Izuru; and Yoshimoto, Masahiko, 4,876,610, Cl. 358-443.000.
Suzuki, Yasuhito; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, 4,876,562, Cl. 346-160.000.
Tajima, Hatsuo; Kubo, Takahiro; and Tajika, Hiroshi, 4,876,574, Cl. 355-253.000.
Yoshinaga, Kazuo; Katagiri, Kazuharu; Kobayashi, Toyoko; and Shinjo, Kenji, 4,876,027, Cl. 252-299.650.

Capello, Richard D.; and Mabry, George R., to De La Rue Printrak, Inc. Method and apparatus for contextual data enhancement. 4,876,726, Cl. 382-4.000.
Capetronic (BSR) Ltd.: *See*—
Ma, John Y.; and Houston, Albert C., 4,876,739, Cl. 455-266.000.
Carboloy Inc.: *See*—
Haque, Sazzadul; Floyd, Thomas O.; Savas, Nick; and Kelm, Walter H., 4,875,812, Cl. 407-104.000.
Carcia, Peter P.; and Coltman, Judith N., to Polaroid Corporation. Camera having auto-trim exposure control. 4,876,566, Cl. 354-436.000.
Cardenas, Alfonso, to Sunclipse, Inc. Disassemblable corrugated board backed chair. 4,875,737, Cl. 297-442.000.
Carian, Peter J.: *See*—
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.
Caridac Pacemakers, Inc.: *See*—
Mayer, David W.; Gilman, Byron L.; Walgren, Susan M.; and Berglund, June M., 4,876,109, Cl. 427-2.000.
Carlson, Christopher M.; and Deninno, Nicholas, to ITT Corporation. Adaptive blanking interface apparatus for self-protection jamming equipment employed in conjunction with radar systems. 4,876,545, Cl. 342-14.000.
Carlson, William P. Leaf vacuum and shredder. 4,875,630, Cl. 241-56.000.
Carlsson, Per A. E.: *See*—
Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., 4,876,284, Cl. 514-657.000.
Carlstedt, Kenneth T.; and Penn, Richard S., to Tecon, Inc. Apparatus for digitizing a composite video signal. 4,876,598, Cl. 358-160.000.
Carlton, Dale E.; Baker, Clifford E.; and Henricksen, Ronald M., to Tektronix, Inc. Method and apparatus for evaluating jitter. 4,876,655, Cl. 364-487.000.
Caroll, James E.; and Zillig, Steven R. Controlled leak path. 4,875,709, Cl. 285-14.000.
Carrier Corporation: *See*—
Brandemuehl, Michael J.; and Reason, John R., 4,875,341, Cl. 62-115.000.
Carstensen, Kenneth J., to Carstensen, Kenneth J. Internally coated tubular system. 4,875,713, Cl. 285-55.000.
Carswell, Robert: *See*—
Meyer, Louis W.; Vanderhider, James A.; and Carswell, Robert, 4,876,019, Cl. 252-32.500.
Cartillier, Andre: *See*—
Autant, Pierre; Cartillier, Andre; and Pigeon, Raymond, 4,876,097, Cl. 426-74.000.
Casad, Burton M.; and Gant, Preston L., to Conoco Inc. Reservoir evaluation using partitioning tracer. 4,876,449, Cl. 250-259.000.
Casberg, John M., to Olin Corporation. Encased pool chemical tablet with domed ends. 4,876,003, Cl. 210-169.000.
Casci, John L.; Lowe, Barrie M.; and Lowe, Thomas V., to Imperial Chemical Industries PLC. Zeolite EU-2. 4,876,412, Cl. 585-640.000.
Cascieri, Margaret A.: *See*—
Applebaum, Joy D.; Bayne, Marvin L.; and Cascieri, Margaret A., 4,876,242, Cl. 514-3.000.
Casida, John E.: *See*—
Palmer, Christopher J.; and Casida, John E., 4,876,274, Cl. 514-452.000.
Casio Computer Co., Ltd.: *See*—
Hara, Kazuya; Inoue, Takanori; and Bito, Hiroyasu, 4,876,441, Cl. 235-488.000.
Okuda, Hiroko; and Takenaka, Makoto, 4,875,400, Cl. 84-626.000.
Casler, Richard J., Jr.: *See*—
Daggett, Kenneth E.; Onaga, Eimei M.; and Casler, Richard J., Jr., 4,876,494, Cl. 318-568.220.
Caspers, John: *See*—
Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 4,875,995, Cl. 208-152.000.
Castaneda, Henry B., to Chemetrics, Inc. Test kit for colorimetric analysis. 4,876,068, Cl. 422-58.000.
Cattanach, James B., to Imperial Chemical Industries PLC. Shaping of syntactic foam. 4,876,055, Cl. 264-512.000.
Caveny, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., to Panduit Corp. Communication box assembly. 4,875,881, Cl. 439-535.000.
Cavitt, Michael B.; and Duncan, David J., to Dow Chemical Company, The. Flexible thermoplastic epoxy resin and coatings prepared therefrom. 4,876,295, Cl. 523-172.000.
Cawthorne, Christopher D., to STC PLC. Signal processing. 4,876,489, Cl. 342-383.000.
CBS Explosives Pty Limited: *See*—
Waldock, Kevin H.; and Wasson, Daniel A., 4,875,950, Cl. 149-21.000.
Cebalo, Tony; and Buntrock, Robert E. Thiadiazole compounds and methods of use. 4,876,044, Cl. 71-90.000.
Central Glass Company, Limited: *See*—
Kondo, Takeshi; Kawai, Toshikazu; and Oshio, Hideki, 4,876,404, Cl. 570-145.000.
Nishimura, Yasunobu; and Kawai, Toshikazu, 4,876,382, Cl. 560-109.000.
Centro Sviluppo Materiali SpA: *See*—
Alota, Santa; Ferrari, Vincenzo; Memmi, Massimo; Pacelli, Leonardo; and Ramundo, Susanna, 4,875,983, Cl. 204-28.000.
Ceramatec, Inc.: *See*—
Virkar, Anil V., 4,876,148, Cl. 428-384.000.
Cerier, Jeffrey C.: *See*—
Trotta, Robert A.; and Cerier, Jeffrey C., 4,875,288, Cl. 30-49.000.
Chado, Hiroyuki; Maeda, Tatsuo; and Nakano, Mitsusou, to Mazda Motor Corporation. Vehicle rear body structure. 4,875,733, Cl. 296-195.000.
Chaintreuil, Rene, to Automobiles Peugeot; and Automobiles Citroen. Clamp for fastening a carpet on a floor. 4,875,250, Cl. 16-4.000.
Chamot, Jean P.: *See*—
Cook, Andre; and Chamot, Jean P., 4,875,437, Cl. 123-411.000.
Champagne, Venerand R. Frame for supporting stairs or the like. 4,875,315, Cl. 52-189.000.
Chandoneet, Yvon: *See*—
Chandonnet, Michel; and Chandonnet, Luc, 4,875,654, Cl. 248-467.000.
Chandonnet, Luc: *See*—
Chandonnet, Michel; and Chandonnet, Luc, 4,875,654, Cl. 248-467.000.
Chandonnet, Michel; and Chandonnet, Luc, to Chandoneet, Yvon. Magnetic picture retainer. 4,875,654, Cl. 248-467.000.
Chandra, Sudhish: *See*—
Feldman, Fred; Klekamp, Mark S.; Hrinda, Michael E.; Shaw, Arthur B.; and Chandra, Sudhish, 4,876,241, Cl. 514-2.000.
Chang, Chung L.: *See*—
Moyer, George A.; and Chang, Chung L., 4,875,735, Cl. 297-367.000.
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., to Mobil Oil Corporation. Zeolite modifications. 4,876,228, Cl. 502-71.000.
Chang, Clarence D.: *See*—
Bowes, Emmerson; Chang, Clarence D.; Han, Scott; and Shihabi, David S., 4,876,411, Cl. 585-533.000.
Chang, John C.: *See*—
Payet, George L.; and Chang, John C., 4,875,901, Cl. 8-115.560.
Chang, Robert W. H.; and Relyea, Keith E., to Minnesota Mining and Manufacturing Company. Lipstick sampling device. 4,876,136, Cl. 428-130.000.
Chang, Tsung K.: *See*—
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.
Chapin, John T.; and Sabia, Raffaele A., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Mineral-oil-free encapsulant composition. 4,876,303, Cl. 524-296.000.
Chapman, Derek D.: *See*—
Byers, Gary W.; and Chapman, Derek D., 4,876,237, Cl. 503-227.000.
Chapotel, Bernard: *See*—
Mauleon, Jean-Louis; Sigaud, Jean-Bernard; Chapotel, Bernard; and Seglin, Leonard, 4,875,993, Cl. 208-113.000.
Chaussadas, Jean, to Mead Corporation, The. Multipack with top panel keel. 4,875,586, Cl. 206-427.000.
Checki, Edward T. Catalytic converter with screen enclosure holding pellets under tension. 4,876,072, Cl. 422-179.000.
Chemetrics, Inc.: *See*—
Castaneda, Henry B., 4,876,068, Cl. 422-58.000.
Chen, Chau-Shiong A.: *See*—
Tobias, Eric; and Chen, Chau-Shiong A., 4,876,216, Cl. 437-67.000.
Chen, Chin H.; Fox, John L.; Specht, Donald P.; and Farid, Samir Y., to Eastman Kodak Company. Dye sensitized photographic imaging systems. 4,876,175, Cl. 430-281.000.
Chen, Harry H. Portable compression grid & needle holder. 4,875,478, Cl. 128-303.00B.
Chen, James C.: *See*—
Kanber, Hilda; and Chen, James C., 4,876,211, Cl. 437-22.000.
Chen, Lao-Jer; and Lowenkron, Steven B., to Dow Chemical Company, The. Color reduction of polymeric isocyanates via multiple solvent fractionation. 4,876,380, Cl. 560-352.000.
Chen, Li-Kou: *See*—
Heh, Shiang-Jiun; Chen, Swe-Kai; Jin, Fu-Teh; and Chen, Li-Kou, 4,875,946, Cl. 148-103.000.
Chen, Swe-Kai: *See*—
Heh, Shiang-Jiun; Chen, Swe-Kai; Jin, Fu-Teh; and Chen, Li-Kou, 4,875,946, Cl. 148-103.000.
Cherko, Carl F.: *See*—
Nowak, Ronald R.; and Cherko, Carl F., 4,875,693, Cl. 279-2.00R.
Chevron, Inc.: *See*—
Nespor, Ronald R., 4,875,822, Cl. 414-563.000.
Chevron Research Company: *See*—
Hsieh, C. Richard; King, Desmond F.; Pettersen, Frederick A.; and Shargay, Cathleen A., 4,875,996, Cl. 208-157.000.
Chi, Tsu T.: *See*—
Weder, Donald E.; and Chi, Tsu T., 4,876,192, Cl. 435-21.000.
Chiang, Weilong L.; Fjare, Douglas E.; and Nowicki, Neal R., to Amoco Corporation. Polyimide polymers and copolymers using 3,5-diaminobenzotrifluoride. 4,876,329, Cl. 528-353.000.
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, to Canon Kabushiki Kaisha. Apparatus for controlling fine particle flow. 4,875,810, Cl. 406-14.000.
Chickering, Robert; and Barabino, William A., to Triad Direct Incorporated. Self-contained liquid dispensing device. 4,875,602, Cl. 222-187.000.
Chikashige, Tadaaki, to Nakamichi Corporation. Data decoding system. 4,876,615, Cl. 360-43.000.

China Petrochemical Development Corporation: *See—*
Lin, Trong-Goang; Ho, Ling-Wen; Ko, An-Nan; and Perng, Yeong-Ju, 4,876,398, Cl. 568-804.000.

Chinske, Louis M.: *See—*
Torgrimson, Lee A.; and Chinske, Louis M., 4,875,576, Cl. 206-219.000.

Chiron Corporation: *See—*
Burke, Rae Lyn; Rosenberg, Steven; Shuster, Jeffrey R.; Tekamp-Olson, Patricia A.; and Valenzuela, Pablo D. T., 4,876,197, Cl. 435-172.300.
Luciw, Paul; Parkes, Deborah L.; and Van Nest, Gary A., 4,876,089, Cl. 424-89.000.

Chisso Corporation: *See—*
Nakajima, Sadaaki; and Terakawa, Taiju, 4,875,844, Cl. 425-131.500.
Saito, Shinichi; Inoue, Hiromichi; Miyazawa, Kazutoshi; Ohno, Kouji; and Ushioda, Makoto, 4,876,026, Cl. 252-299.610.

Chivers, Dolores. Apartment mailbox signal device. 4,875,621, Cl. 232-34.000.

Choh, Nobuo: *See—*
Morimoto, Akira; Choh, Nobuo; and Noguchi, Noriyoshi, 4,876,251, Cl. 514-193.000.

Chow, Kung C., to Westinghouse Electric Corp. Apparatus for detecting unsymmetrical bipolar waveforms. 4,876,624, Cl. 361-87.000.

Christie, Howard W.: *See—*
Engel, James F.; Byerley, Thomas J.; and Christie, Howard W., 4,876,323, Cl. 526-310.000.

Christopher, Glenn B.; and Motley, Jerry D., to Jet Research Center, Inc. Apparatus for perforating wells. 4,875,413, Cl. 102-307.000.

Chrysler Motors Corporation: *See—*
Copp, David F.; and Wojciehowski, Stephen J., 4,875,728, Cl. 293-126.000.
Leising, Maurice B.; Benford, Howard L.; and Holbrook, Gerald L., 4,875,391, Cl. 74-866.000.

Chu, Cynthia T-W: *See—*
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.

Chu, Pochen: *See—*
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.

Chun, Jino: *See—*
Norwood, Roger D.; Chun, Jino; and Patel, Pravin P., 4,876,671, Cl. 365-233.000.

Ciba-Geigy Corporation: *See—*
Hoehener, Alfred; and Smith, Roy E., 4,876,333, Cl. 534-575.000.
Karydas, Athanasios, 4,876,018, Cl. 252-8.551.
Kump, Wilhelm; and Traxler, Peter, 4,876,258, Cl. 514-254.000.
Phaff, Rox; and Bedekovic, Davor, 4,876,357, Cl. 548-463.000.
Saitoh, Yoshiro; and Tatsumi, Takashi, 4,876,134, Cl. 428-73.000.
Schmid, Wolfgang, 4,876,265, Cl. 514-370.000.
Schurter, Rolf; Meyer, Willy; and Fory, Werner, 4,875,923, Cl. 71-92.000.
Schurter, Rolf; and Diel, Peter J., 4,875,926, Cl. 71-94.000.
Seltzer, Raymond; Ravichandran, Ramanathan; and Patel, Ambelal R., 4,876,300, Cl. 524-100.000.
Tzikas, Athanassios; and Herzig, Paul, 4,876,334, Cl. 534-632.000.
Waespe, Hans-Rudolf, 4,876,270, Cl. 514-439.000.

Cipolla, Thomas M.; Horton, Raymond R.; Murphy, Philip; and Palmer, Michael J., to International Business Machines Corporation. Alignment device. 4,875,614, Cl. 228-5.500.

Citowsky, Elya L. Gold-tin eutectic lead bonding method and structure. 4,875,617, Cl. 228-123.000.

Citta, Richard W.; Gosc, Paul M.; Mutzabaugh, Dennis M.; and Sgrignoli, Gary J., to Zenith Electronics Corporation. Secure data packet transmission system and method. 4,876,718, Cl. 380-42.000.

CKD Kabushiki Kaisha: *See—*
Mizuno, Shinji; Kawato, Humio; Hanazawa, Kazuyoshi; Aoyama, Tatsuaki; and Ogasawara, Yoshinari, 4,875,911, Cl. 55-162.000.

CLAAS OHG: *See—*
Ostrup, Heinrich; and Hegger, Josef, 4,875,331, Cl. 56-208.000.

Clagett, Donald C.: *See—*
Blackmon, Kenneth P.; Clagett, Donald C.; Fox, Daniel W.; Maresca, Louis M.; and Shafer, Sheldon J., 4,876,317, Cl. 525-433.000.

Clancy, Kevin F., to Honeywell, Inc. Low cost keyboard with key tops defining surface of curved profile. 4,876,415, Cl. 200-5.00A.

Clark, Abbot F., to Alcon Laboratories, Inc. Methods for controlling ocular hypertension with angiostatic steroids. 4,876,250, Cl. 514-179.000.

Clark, Brian, to Schlumberger Technology Corporation. Method and apparatus for testing and calibrating an electromagnetic logging tool. 4,876,511, Cl. 324-338.000.

Clark, Jon E.: *See—*
Schumacher, Doris P.; Clark, Jon E.; and Murphy, Bruce L., 4,876,352, Cl. 548-232.000.

Clark, Paul L. Continuously variable transmission. 4,875,894, Cl. 474-49.000.

Clark, Ross C.: *See—*
Wolf, Carol L.; LaVelle, William M.; and Clark, Ross C., 4,876,105, Cl. 426-573.000.

Clarke, David J.: *See—*
Blake, Barry C.; and Clarke, David J., 4,876,504, Cl. 324-204.000.

Clarke, John L., Jr. Gypsum-based insecticide pellets and method of manufacture. 4,876,091, Cl. 424-421.000.

Clauss, Allen D.; and Gosselink, Eugene P., to Procter & Gamble Company, The. Substituted glutaric and adipic diperoxyacids. 4,876,046, Cl. 8-111.000.

Clayton, Colin G.; and Spackman, Ramon, to United Kingdom Atomic Energy Authority. Flow measurement. 4,876,056, Cl. 376-152.000.

Clayton Dewandre Co. Ltd.: *See—*
Hawker, Michael J., 4,875,742, Cl. 303-119.000.

Cleary, Terrance M.: *See—*
Donahue, Raymond J.; Cleary, Terrance M.; Hauenstein, Frederick M.; and Marcellis, Daniel H., 4,875,517, Cl. 164-34.000.
Donahue, Raymond J.; Hesterberg, William G.; and Cleary, Terrance M., 4,875,985, Cl. 204-64.00T.

Clecim: *See—*
Forestier, Guy, 4,875,663, Cl. 266-272.000.

Clemente, Roger. Electric fan assembly for over-the-road trucks. 4,875,521, Cl. 165-39.000.

Climent, Jean-Pierre; Petelet, Georges; and Tronel, Jean-Claude, to Commissariat a l'Energie Atomique. Apparatus for the detection of an electromagnetic pulse, more particularly due to a nuclear explosion. 4,876,551, Cl. 342-460.000.

Clough, John M.: *See—*
Anthony, Vivienne M.; Clough, John M.; DeFraine, Paul; and Godfrey, Christopher R. A., 4,876,264, Cl. 514-345.000.

CMI International, Inc.: *See—*
McKibben, Kenneth D., 4,876,015, Cl. 210-695.000.

Coca-Cola Company, The: *See—*
Burke, Robert W., II; Cahen, Albert J., Jr.; Credle, William S., Jr.; Gupta, Ashis S.; and Heenan, Richard H., 4,875,508, Cl. 141-2.000.

Cocain, H. William: *See—*
Melby, Earl G.; and Cocain, H. William, 4,876,308, Cl. 524-780.000.

Cochran, Dwayne V.: *See—*
Frink, Tommy S.; Reed, Lowell M.; Cochran, Dwayne V.; and McNair, Will L., 4,875,530, Cl. 175-27.000.

Codespi Corporation: *See—*
Lea Plaza, Carlos, 4,875,471, Cl. 128-69.000.

Coffman, James E.: *See—*
Barron, Salvador; and Coffman, James E., 4,876,717, Cl. 380-25.000.

Cohen, Abraham D.; Diana, William D.; and Baiel, James J., to Exxon Chemical Patents Inc. Process for the recovery of alcohols using a perfluorinated ionomer membrane. 4,876,403, Cl. 568-913.000.

Cohen, Allen L. Cosmetic artificial nails. 4,876,121, Cl. 428-15.000.

Cohen, Hyman H.: *See—*
Cohen, Joseph D.; and Cohen, Hyman H., 4,875,432, Cl. 116-223.000.

Cohen, Joseph D.; and Cohen, Hyman H. Volleyball scoreboard. 4,875,432, Cl. 116-223.000.

Cohen, Stephen. Jacket for displaying information. 4,875,237, Cl. 2-94.000.

Cohrs, Donald E., to Kartridg Pak Co., The. Low pressure cap lift with hydraulic return. 4,875,324, Cl. 53-88.000.

Coleman, Brian: *See—*
Zon, Arie Van; and Coleman, Brian, 4,876,020, Cl. 252-40.500.

Colgate-Palmolive Company: *See—*
Kent, Steven, 4,875,248, Cl. 15-143.00R.
Wigglesworth, Paul; and Ellis, Roger D., 4,876,038, Cl. 261-152.000.

Coller, John H.; and Littleton, Donald N., to D. G. Shelter Products Co. Method for producing thermoplastic frames for fenestration. 4,875,271, Cl. 29-432.000.

Collett, David J.: *See—*
Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, 4,876,181, Cl. 430-522.000.

Collette, Douglas P.: *See—*
Jacobs, Paul H.; and Collette, Douglas P., 4,876,741, Cl. 455-47.000.

Colley, James D., to Tampa Electric Company. Process of desulfurization. 4,876,076, Cl. 423-242.000.

Collier, David S. Carpet repair steam system. 4,875,249, Cl. 15-398.000.

Coltman, Judith N.: *See—*
Carcia, Peter P.; and Coltman, Judith N., 4,876,566, Cl. 354-436.000.

Colver, Frank, to HC Power, Inc. Power factor corrector. 4,876,497, Cl. 323-211.000.

Commissariat a L'Energie Atomique: *See—*
Bernard, Patrice; Sauvage, Laurent; Girard, Henri; and Ferrero, Jean-Pierre, 4,876,057, Cl. 376-216.000.
Climent, Jean-Pierre; Petelet, Georges; and Tronel, Jean-Claude, 4,876,551, Cl. 342-460.000.

Commonwealth Scientific and Industrial Research Organisation: *See—*
Wingate-Hill, Robin; and Hadaway, Bernard M., 4,875,511, Cl. 144-208.00R.

Compagnie de Raffinage et de Distribution Total France: *See—*
Mauleon, Jean-Louis; Sigaud, Jean-Bernard; Chapotel, Bernard; and Seglin, Leonard, 4,875,993, Cl. 208-113.000.

Compeau, David E.; Manuel, Mark; and Rogers, Lloyd W., Jr., to General Motors Corporation. Closure latch. 4,875,723, Cl. 292-201.000.

Computer Output Processors and Engineering, Inc.: *See—*
Spyra, Rudolf A., 4,875,668, Cl. 270-45.000.

Comte, Pierre-Andre ; Schurch, Hans; and Ritter, Gebhard, to Synthes (U.S.A.). Device for treating a bone. 4,875,475, Cl. 128-924.00Y.

Con-Tech Industries, Inc.: *See—*
Romano, James, 4,875,502, Cl. 137-627.500.

Concept II, Inc.: *See—*
Dreissigacker, Peter D.; and Dreissigacker, Richard A., 4,875,674, Cl. 272-72.000.

Condon, David C.; and Stumfall, David M., to Printronix, Inc. Magnetic print hammer actuator protection circuit. 4,875,409, Cl. 101-93.290.

Conner Peripherals, Inc.: *See—*
Squires, John P.; and Shrinkle, Louis J., 4,876,491, Cl. 318-138.000.

Connolly, Donald P. Support systems and apparatus for suspending and resuspending articles at selected height positions. 4,875,653, Cl. 248-332.000.

Connor, Michael J., to Boeing Company, The. Conically-shaped corrugated seal. 4,875,692, Cl. 277-212.0FB.

Conoco Inc.: *See—*
Casad, Burton M.; and Gant, Preston L., 4,876,449, Cl. 250-259.000.

Conroy, Peter J., to United Kingdom Atomic Energy Authority. Temperature measurement. 4,876,059, Cl. 376-247.000.

Conti Complett S.P.A.: *See—*
Conti, Roberto, 4,875,423, Cl. 112-438.000.

Conti, Roberto, to Conti Complett S.P.A. Overedge stitch seam. 4,875,423, Cl. 112-438.000.

Cook, Andre; and Chamot, Jean P., to Procedes Vernet. Apparatus for controlling the flow of cooling fluid in an engine. 4,875,437, Cl. 123-411.000.

Cook, Frederick A., Jr.: *See—*
Santos, Alfred J.; Cook, Frederick A., Jr.; Duncan, Scott M.; and Moseley, John, 4,875,785, Cl. 384-448.000.

Coopman, Lucien: *See—*
Moeneclaey, Denis; Coopman, Lucien; and Victoor, Johnny, 4,875,505, Cl. 139-448.000.

Copeland-Sirois Enterprises, Inc.: *See—*
Sirois, William L., 4,875,430, Cl. 114-355.000.

Copp, David F.; and Wojciehowski, Stephen J., to Chrysler Motors Corporation. Bumper facia attachment structure. 4,875,728, Cl. 293-126.000.

Corbeels, Roger J.: *See—*
Najjar, Mitri S.; and Corbeels, Roger J., 4,876,031, Cl. 252-373.000.

Cordis Corporation: *See—*
Higgins, Sheryl W., 4,875,481, Cl. 128-344.000.

Cornelison, Richard C.: *See—*
Smith, Edward M.; and Cornelison, Richard C., 4,875,436, Cl. 122-7.00R.

Corning Incorporated: *See—*
DeAngelis, Thomas P., 4,876,227, Cl. 501-97.000.
Lentz, William P., deceased, 4,875,917, Cl. 65-3.110.

Corriea, David J.: *See—*
Moe, Rolf; Corriea, David J.; and Premeau, John E., 4,875,824, Cl. 414-751.000.

Cosmo Instruments Co., Ltd.: *See—*
Uchiyama, Yoshichika; and Tsuchiya, Atsushi, 4,875,932, Cl. 73-202.000.

Coss, Malcolm M.; and Tolman, Richard L., to Merck & Co., Inc. Alkylpiperazinylpyridines as hypoglycemic agents. 4,876,256, Cl. 514-252.000.

Cotone, Cris A. Reciprocating rolling massager with varying pressure and varying wheel placement. 4,875,470, Cl. 128-57.000.

Cottenceau, Remi: *See—*
Vermot-Gaud, Jacque; Cottenceau, Remi; and Zuercher, Erwin, 4,875,347, Cl. 66-219.000.

Cotteret, Jean: *See—*
Grollier, Jean F.; and Cotteret, Jean, 4,875,902, Cl. 8-406.000.

Coulborn, John W.; and Krug, John A., to ACF Industries, Incorporated. End structure for railway car. 4,875,417, Cl. 105-248.000.

Coulston, John W.; and Huffman, David C., to Lechler, Inc. Free passage nozzle. 4,875,627, Cl. 239-466.000.

Courter, Jack P., to Boeing Company, The. Modular cargo conveyor and restraint system for aircraft. 4,875,645, Cl. 244-137.100.

Cousens, James A.: *See—*
Dawson, John F.; Thompson, Eldon J.; and Cousens, James A., 4,876,651, Cl. 364-449.000.

Cowley, Colin H., to Active Memory Technology Ltd. Vlsi data processor containing an array of ICs, each of which is comprised primarily of an array of processing. 4,876,641, Cl. 364-200.000.

Cox, David A., to GTE Products Corporation. Arc lamp with surface arc resistant barrier. 4,876,483, Cl. 313-634.000.

Craighead, Jimmy R., to Manville Corporation. Packaging machine jamming detector. 4,875,323, Cl. 53-48.000.

Crapser, James R.: *See—*
Buhler, James E.; Crapser, James R.; Miller, Allen D.; and Wefler, Mark E., 4,875,626, Cl. 239-314.000.

Crass, Guenther: *See—*
Paschke, Klaus; Crass, Guenther; and Dinter, Peter, 4,875,963, Cl. 156-249.000.

Creagan, Richard W.; and Nicol, Alan J., to Black Clawson Company, The. Horizontal twin wire machine with vertically adjustable open roll and deflector blade. 4,875,977, Cl. 162-300.000.

Creasy, Walter S.; and Lorenz, Donald H., to Hydromer, Inc. Shaving articles lubricious when wet and compositions therefor. 4,875,287, Cl. 30-34.010.

Credle, William S., Jr.: *See—*
Burke, Robert W., II; Cahen, Albert J., Jr.; Credle, William S., Jr.; Gupta, Ashis S.; and Heenan, Richard H., 4,875,508, Cl. 141-2.000.

Crist, Larry L. Underlift attachment for tow trucks. 4,875,269, Cl. 29-401.100.

Crosby, John J.; and Napiorkowski, John J., to GTE Products Corporation. Signal circuit protector device for consumer use. 4,876,713, Cl. 379-412.000.

Crosby, William: *See—*
Duck, Peter; Bender, Robert; Crosby, William; and Robertson, John G., 4,876,187, Cl. 435-6.000.

Crudgington, Cleveland B., Jr. Champagne bottle opener. 4,875,394, Cl. 81-3.080.

Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela. Method for stabilizing clay minerals during oil exploitation by steam injection. 4,875,809, Cl. 405-263.000.

Culbreath, J. Charles. Mouthpiece plates of flute-type wind instruments. 4,875,401, Cl. 84-384.000.

Culp, Gordon W.: *See—*
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,876,178, Cl. 430-314.000.

Curtin, William J. Series connected telephone service system. 4,876,711, Cl. 379-94.000.

Curtiss, Linda K.: *See—*
Smith, Richard; Lamb, Peta-Maree; Curtiss, Linda K.; and Witztum, Joseph, 4,876,188, Cl. 435-7.000.

Cushing, Donald S.: *See—*
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.

Cwirzen, Casimir Z.; and Kupferschmidt, Albert, to Northern Telecom Limited. Electrically protected connector for telephone distribution frames. 4,875,868, Cl. 439-188.000.

Czech, Joachim. Dispenser for paste-like products. 4,875,604, Cl. 222-257.000.

Czogalla, Claus-D., to von der Haar-Czogalla, Rita. Process for the production of thiophenes from alpha-methylene ketones in the single-stage process and new ortho-fused thiophenes produced by means of the process. 4,876,361, Cl. 549-41.000.

D. G. Shelter Products Co.: *See—*
Coller, John H.; and Littleton, Donald N., 4,875,271, Cl. 29-432.000.

Daggett, Kenneth E.; Onaga, Eimei M.; and Casler, Richard J., Jr., to Unimation, Inc. Position and velocity feedback system for a digital robot control. 4,876,494, Cl. 318-568.220.

Dahl, Frank L. Vending machine for vending one-at-a-time merchandise articles of a plurality of similar such merchandise objects, each of a substantially rectangular parallelopiped shape, such as a newspaper, magazine, or the like. 4,875,598, Cl. 221-4.000.

Daikin Industries Ltd.: *See—*
Hisanaga, Yorisato; Shimokawa, Kazuhiro; Kawano, Toshihiko; Suita, Yasunori; and Yamashita, Tsuneo, 4,876,245, Cl. 514-29.000.

Daiku, Yoshiharu: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Daimler-Benz Aktiengesellschaft: *See—*
Leiber, Heinz, 4,875,338, Cl. 60-550.000.

Dainihon Glass Industry Co., Ltd.: *See—*
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.

Dainippon Screen Mfg. Co., Ltd.: *See—*
Isono, Koichi; and Sho, Ikuo, 4,876,456, Cl. 250-561.000.

Daiwa Kasei Kogyo Kabushiki Kausha: *See—*
Takagi, Akira; Oyaizu, Hirotsugu; Takahashi, Nobuatsu; and Kume, Kiyotaka, 4,875,647, Cl. 248-74.300.

Dallas Semiconductor Corporation: *See—*
Podkowa, William J.; and Williams, Clark R., 4,876,465, Cl. 307-443.000.

Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., to J.M. Huber Corporation. Mineral filler fire retardant composition and method. 4,876,291, Cl. 521-124.000.

Dallum, Barry J., to Owens-Corning Fiberglas Corporation. Underground tank. 4,876,124, Cl. 428-34.500.

Daltrozzo, Ewald; and Sulger, Werner, to BASF Aktiengesellschaft. Methine dyes having a pyridyl group and a pyridyl or a quinolinyl group. 4,876,347, Cl. 546-176.000.

Daly, Robert C.: *See—*
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.

Damon, Robert E., II, to Sandoz Pharm. Corp. Arylcyclohexane and arylcyclohexene analogs of mevalonolactone derivatives and their use. 4,876,280, Cl. 514-510.000.

Dana Corporation: *See—*
Holman, James L.; and Willford, George A., 4,875,383, Cl. 74-473.00R.
Kern, Karle O., Jr., 4,875,794, Cl. 403-132.000.

Daniel, Mervyn F.: *See—*
Smith, Gilbert W.; Daniel, Mervyn F.; Barton, John W.; and Ratcliffe, Norman M., 4,876,150, Cl. 428-411.100.

Dara, Prithipal, to Reliance Comm/Tec Corporation. Mid-plane board and assembly therefor. 4,876,630, Cl. 361-413.000.

Darche, Yves: *See—*
Gongora, Henri; and Darche, Yves, 4,876,389, Cl. 568-26.000.

Da Silva, Jean, to E.R.C.D. Industries Inc. Air pump pressure control system for inflating pairs of automotive tires. 4,875,509, Cl. 141-38.000.

Data Compression Corporation: *See*—
Storer, James A., 4,876,541, Cl. 341-51.000.

Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Abernathy, Joe V.; and Wooldridge, Timothy A., to Texas Instruments Incorporated. Wafer processing apparatus. 4,875,989, Cl. 204-298.000.

Davis, Christopher K.; and Beasom, James D., to Harris Corporation. Low top gate resistance JFET structure. 4,876,579, Cl. 357-22.000.

Davis, Craig M.; and Rasmussen, Richard R., to National Semiconductor Corporation. High frequency ECL voltage controlled ring oscillator. 4,876,519, Cl. 331-57.000.

Davydov, Anatoly B.: *See*—
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.

Dawes, Peter W.: *See*—
Bender, Stanley I.; Butler, Lawrence; and Dawes, Peter W., 4,875,655, Cl. 248-557.000.

Dawson, John F.; Thompson, Eldon J.; and Cousens, James A., to Honeywell Inc. Digital map system. 4,876,651, Cl. 364-449.000.

De La Rue Printrak, Inc.: *See*—
Capello, Richard D.; and Mabry, George R., 4,876,726, Cl. 382-4.000.

De La Rue Systems, Ltd.: *See*—
Lacey, Paul D.; and Martin, Anthony, 4,875,589, Cl. 209-534.000.

DeAngelis, Thomas P., to Corning Incorporated. Reaction sintered boride-oxide-silicon nitride for ceramic cutting tools. 4,876,227, Cl. 501-97.000.

Debaes, Johny, to N.V. Michel Van De Wiele. Process and apparatus for guiding the weft threads in weaving looms. 4,875,507, Cl. 139-450.000.

DeBoer, Charles D., to Eastman Kodak Company. Dye-receiving element containing spacer beads in a laser-induced thermal dye transfer. 4,876,235, Cl. 503-227.000.

DeCamp, Howard S.: *See*—
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,876,178, Cl. 430-314.000.

De Deugd, Johannes A. G.; and van Moorsel, Josephus J. Color television display tube. 4,876,477, Cl. 313-404.000.

Deeba, Michel: *See*—
Agrawal, Rakesh; Auvil, Steven R.; and Deeba, Michel, 4,876,377, Cl. 558-416.000.

Deem, William C. Notebook binder/label holder. 4,875,793, Cl. 402-3.000.

Deere & Company: *See*—
Boardman, Peter W.; and McCombs, Daniel G., 4,875,356, Cl. 72-321.000.
Deutsch, Timothy A.; Schreiner, Joel M.; and McBee, Steve H., 4,875,330, Cl. 56-41.000.
Foley, Daniel M.; Snyder, Michael D.; and Long, John D., 4,875,527, Cl. 172-248.000.
Hadley, Howard C., 4,875,421, Cl. 111-200.000.
Hagerer, Paul; Glaser, Fritz; Klimmer, Josef W.; and Kunze, Reinhard, 4,875,889, Cl. 460-1.000.
Larson, Scott A.; and Johnson, Duane R., 4,875,563, Cl. 192-4.00A.
Turner, Reed J.; Peters, Loren W.; Wilson, John E.; and Bennett, Robert E., 4,875,891, Cl. 460-110.000.

Defendorf, James: *See*—
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,875,773, Cl. 356-328.000.

DeFraine, Paul: *See*—
Anthony, Vivienne M.; Clough, John M.; DeFraine, Paul; and Godfrey, Christopher R. A., 4,876,264, Cl. 514-345.000.

DeGrave, Gilbert F., to Eastman Kodak Company. Process for manufacturing a grain chill roller. 4,875,262, Cl. 29-121.800.

Dekker, Nicolaas M. J.; Edwards, John W.; and James, Adrian W., to General Electric Company, p.l.c., The. Active noise control. 4,876,722, Cl. 381-71.000.

Delair, Jacques; and Peyret, Olivier, to General Electric CGR S.A. X-ray tube with a molybdenum target. 4,876,705, Cl. 378-144.000.

Delatorre, Leroy C., to Panex Corporation. Pressure sensor system. 4,875,368, Cl. 73-151.000.

Delatorre, Leroy C., to Panex Corporation. Pressure sensor system. 4,875,369, Cl. 73-151.000.

Delfield Precision Engineering Limited: *See*—
Wakefield, Peter D., 4,875,293, Cl. 33-508.000.

De Marchi, Jean-Louis: *See*—
Mabboux, Michel; De Marchi, Jean-Louis; and Legon, Fabrice, 4,875,299, Cl. 36-117.000.

Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; and Sotolongo, Thomas J., to AMP Incorporated. Coaxial printed circuit board connector. 4,875,865, Cl. 439-101.000.

Deneke, Ulfert; Nagel, Rolf; Rothe, Anselm; and Freitag, Helmut, to Boehringer Mannheim GmbH. Multilayer test strip device with a dissolvable reagent layer. 4,876,067, Cl. 422-56.000.

Deninno, Nicholas: *See*—
Carlson, Christopher M.; and Deninno, Nicholas, 4,876,545, Cl. 342-14.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Maeda, Tetsuro; Wada, Fukuaki; Ohoka, Susumu; and Okamoto, Akihiro, 4,876,145, Cl. 428-327.000.
Okuda, Akihiko; Totake, Yukinori; and Matsumura, Hideki, 4,876,407, Cl. 570-239.000.

Dennany, Robert D., Jr.; and Pontbriand, Duane J., to ITT Corporation. Quick connect connector. 4,875,715, Cl. 285-87.000.

Dennison Manufacturing Company: *See*—
Tighe, Laurence E.; and Parker, Tim, 4,876,423, Cl. 219-10.55E.

Denny, David S.; Metzger, Edward C. R.; Rexroad, John; and Glynn, William, to SINCO, Inc. Debris barrier. 4,875,549, Cl. 182-138.000.

Dentsply Research & Development Corp.: *See*—
Jefferies, Steven R.; and Huang, Chin-Teh, 4,875,858, Cl. 433-226.000.

Depoli, Erminio, to Baruffaldi S.p.A. Coupling with two clutches, especially for looms. 4,875,565, Cl. 192-48.200.

DeSaro, Robert; Doyle, Edward F.; Metcalfe, Christopher I.; and Patch, Keith D., to Gas Research Institute. Direct contact raining bed counterflow cullet preheater and method for using. 4,875,919, Cl. 65-27.000.

Desbois, Michael; and Disdier, Camille, to Rhone-Poulenc Specialistes Chimiques. Process for the halogenation, nitration and fluorination of aromatic derivatives. 4,876,376, Cl. 558-412.000.

Design Systems, Inc.: *See*—
Rudy, Norman A.; and Tomlin, James S., 4,875,254, Cl. 17-61.000.

Dessau, Ralph M.: *See*—
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.

DeSutter, Steven C.: *See*—
Gardner, Bronson; Keener, Melvin E.; DeSutter, Steven C.; Jagatich, Carl T.; and Felice, Ralph A., 4,876,647, Cl. 364-420.000.

Deutsch, Timothy A.; Schreiner, Joel M.; and McBee, Steve H., to Deere & Company. Alignable cotton conveying structure for a transversely movable row unit. 4,875,330, Cl. 56-41.000.

Deutsche Thomson-Brandt GmbH: *See*—
Kaaden, Jurgen; and Schandl, Hartmut, 4,876,614, Cl. 360-10.200.
Rilly, Gerard; and Rodriguez, Jose-Ignacio, 4,876,636, Cl. 363-21.000.

Devereux, William S.; and Westerfield, Edwin E., to Johns Hopkins University, The. Pseudo-Random code generator for use with a global positioning system. 4,876,659, Cl. 364-717.000.

DeWachter, Gary, to Reliance Electric Company. Snap-ring with pin release seal. 4,875,786, Cl. 384-482.000.

DeWeert, William R.; and Manning, Frank. Muzzleloading powder and projectile tool. 4,875,303, Cl. 42-90.000.

Dewert, Heribert: *See*—
Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Burggraf, Peter, 4,875,406, Cl. 98-2.010.

Dewitte, Philippe: *See*—
Canaud, Michel; and Dewitte, Philippe, 4,875,833, Cl. 417-259.000.

D'Hoogue, Martial; Perrette, Claude; and Goffinet, Pierre, to Union Generale De Savonnerie. Device for dosing and dispensing a fluid product to be deposited freely in the mobile enclosure of a machine. 4,875,600, Cl. 222-52.000.

Diafoil Company, Limited: *See*—
Utsumi, Shigeo, 4,876,137, Cl. 428-141.000.

Diamond Shamrock Chemicals Co.: *See*—
Higbie, Francis A.; LieBerman, Robert A.; and Rose, Ira M., 4,876,384, Cl. 560-224.000.

Diana, William D.: *See*—
Cohen, Abraham D.; Diana, William D.; and Baiel, James J., 4,876,403, Cl. 568-913.000.

Dickenson, Haydn G. W.; and Huntington, David H., to Procter & Gamble Company, The. Laundry products. 4,876,023, Cl. 252-90.000.

Dickerson, Daryl E. Handlegrip cruise assist device. 4,875,386, Cl. 74-551.900.

DiCosimo, Robert; Burrington, James D.; and Suresh, Dev D., to Standard Oil Company, The. Process for making 3-cyanopyridine. 4,876,348, Cl. 546-252.000.

Diehl GmbH & Co.: *See*—
Stadler, Hansjorg; and von Laar, Klaus, 4,875,414, Cl. 102-307.000.

Diel, Peter J.: *See*—
Schurter, Rolf; and Diel, Peter J., 4,875,926, Cl. 71-94.000.

Diesel Kiki Co., Ltd.: *See*—
Ichihashi, Kouji; and Yasuma, Jun-ichi, 4,875,501, Cl. 137-625.640.
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,875,835, Cl. 417-295.000.
Suzuki, Nobuhiko; and Aoki, Tetuya, 4,875,832, Cl. 417-222.000.

Diffracto Ltd.: *See*—
Pryor, Timothy R., 4,875,776, Cl. 356-372.000.

DiGiacomo, Ralph: *See*—
McGuire, Michael; DiGiacomo, Ralph; Palmer, Marcia; and Liggett, Louis, 4,876,104, Cl. 426-57.000.

Digital Equipment Corporation: *See*—
Jones, Bruce A., 4,875,625, Cl. 239-124.000.
Steltzer, Edward L., 4,875,635, Cl. 242-67.30R.
Welch, Glenn S.; Fidrych, Stephen; Romm, Michael; and Maurer, Bernie J., 4,875,880, Cl. 439-536.000.

Dingle, Donald A.: *See*—
Roy, Bernard J. J.; O'Connor, Lorne D.; Rioux, Philippe F.; Dingle, Donald A.; and Raymond, Andre L., 4,876,597, Cl. 358-141.000.

Dinter, Peter: *See*—
Paschke, Klaus; Crass, Guenther; and Dinter, Peter, 4,875,963, Cl. 156-249.000.

Di Paola, Denis: *See*—
Cagnon, Francois; Di Paola, Denis; Austruy, Georges; and Vinchon, Andre , 4,875,850, Cl. 431-8.000.

Dirscherl, Teresa A.: *See*—
Solarek, Daniel B.; Dirscherl, Teresa A.; Hernandez, Henry R.; and Jarowenko, Wadym, 4,876,336, Cl. 536-109.000.

Disdier, Camille: *See*—
Desbois, Michael; and Disdier, Camille, 4,876,376, Cl. 558-412.000.

Dittmar, Walter: *See*—
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.

Dixon, George G.; Parlman, Robert M.; and Stewart, Wayne, to Phillips Petroleum Company. Organophilic clay suspension medium. 4,876,030, Cl. 252-315.200.

Dobhan, Herbert: *See*—
Bauer, Bernhard; and Dobhan, Herbert, 4,875,787, Cl. 384-548.000.

Dobosz, Ronald F., to Boro, John R.; and Dobosz, Ronald F. Wind deflector. 4,875,431, Cl. 116-173.000.

Dr. Ing. h.c.F. Porsche AG: *See*—
Gietzen, Staas; Weiner, Hans; Hain, Klaus; Hofbauer, August; and Hawener, Juergen, 4,875,643, Cl. 244-53.00A.

Dr. Ing H.c.F. Porsche Aktiengesellschaft: *See*—
Shaw, Steven; and Weiss, Elmar, 4,875,556, Cl. 188-72.400.

Doi, Isao: *See*—
Hotomi, Hideo; Osawa, Izumi; Iino, Syuji; Doi, Isao; and Fujiwara, Masanori, 4,876,168, Cl. 430-58.000.

Doi, Miwako: *See*—
Iwai, Isamu; Okamoto, Toshio; and Doi, Miwako, 4,876,665, Cl. 364-900.000.

Doi, Yoshiharu, to Mitsubishi Kasei Corporation. Copolyester and process for producing the same. 4,876,331, Cl. 528-361.000.

Doinghaus, Hermann: *See*—
Moeckl, Ernst; Stumpf, Jorg; Hardt, Walter; and Doinghaus, Hermann, 4,875,418, Cl. 108-50.000.

Dola, Frank P.: *See*—
Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; and Sotolongo, Thomas J., 4,875,865, Cl. 439-101.000.

Doleschall, Sandor: *See*—
Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela, 4,875,809, Cl. 405-263.000.

Domain Technology: *See*—
Bornstein, Jonathan G., 4,876,117, Cl. 427-130.000.

Donahue, Raymond J.; Cleary, Terrance M.; Hauenstein, Frederick M.; and Marcellis, Daniel H., to Brunswick Corporation. Method of producing salt cores for use in die casting. 4,875,517, Cl. 164-34.000.

Donahue, Raymond J.; Hesterberg, William G.; and Cleary, Terrance M., to Brunswick Corporation. Method and appparatus for producing titanium. 4,875,985, Cl. 204-64.00T.

Donaldson Company, Inc.: *See*—
Betts, Peter; and Jahn, Darrell D., 4,876,011, Cl. 210-526.000.

Dondorf, Wolfgang, to Pulsotronic Merten GmbH & Co. KG. Position detector for the movable element of a fluid-operated actuator. 4,876,531, Cl. 340-686.000.

Donnay, James A.; Jensen, Van E., Jr.; and Kruzel, Bryon S., to Minnesota Mining and Manufcturing. Buffing apparatus for book-fold carton; and method. 4,875,895, Cl. 493-117.000.

Dorenkamp, Richard: *See*—
Kramer, Karl-Martin; and Dorenkamp, Richard, 4,875,449, Cl. 123-400.000.

Dornbrock, Ronald F.: *See*—
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.

Dornbush, Robert A., Sr.: *See*—
Ballinger, Kedric L.; and Dornbush, Robert A., Sr., 4,875,685, Cl. 273-195.00B.

Dougherty, John J., to General Electric Company. Circuit breaker warning relay and control accessory. 4,876,622, Cl. 361-94.000.

Dougherty, Richard M., to Motorola, Inc. High gain distributed amplifiers. 4,876,516, Cl. 330-54.000.

Dow Chemical Company, The: *See*—
Cavitt, Michael B.; and Duncan, David J., 4,876,295, Cl. 523-172.000.
Chen, Lao-Jer; and Lowenkron, Steven B., 4,876,380, Cl. 560-352.000.
Meister, Bernard J.; Dryzga, Craig D.; and Tien, Li C., 4,876,312, Cl. 525-263.000.
Meyer, Louis W.; Vanderhider, James A.; and Carswell, Robert, 4,876,019, Cl. 252-32.500.

Dow Corning Corporation: *See*—
Lo, Peter Y. K.; and Ziemelis, Maris J., 4,876,039, Cl. 264-4.700.
Witucki, Gerald L.; and Plueddemann, Edwin P., 4,876,154, Cl. 428-447.000.

Dowle, Michael D.: *See*—
Butina, Darko; Dowle, Michael D.; Bays, David E.; and Webb, Colin F., 4,876,267, Cl. 514-415.000.

Dowrick, John S., to Beecham Group p.l.c. Injectable compositions of amoxycillin trihydrate. 4,876,086, Cl. 424-80.000.

Doyle, Edward F.: *See*—
DeSaro, Robert; Doyle, Edward F.; Metcalfe, Christopher I.; and Patch, Keith D., 4,875,919, Cl. 65-27.000.

Dragerwerk Aktiengesellschaft: *See*—
Waschke, Christine; Topfer, Lothar; and Rath, Alfred, 4,875,477, Cl. 128-206.210.

Dragnea, Felicia: *See*—
Lee, Andrew J.; Sanduja, Mohan L.; Sugathan, Kenneth; Dragnea, Felicia; and Horowitz, Carl, 4,875,410, Cl. 101-170.000.

Drake, Charles A.: *See*—
Ewert, Warren M.; Kubicek, Donald H.; and Drake, Charles A., 4,876,410, Cl. 585-516.000.

Drake, Donald J.: *See*—
O'Neill, James F.; Drake, Donald J.; and Hawkins, William G., 4,875,968, Cl. 156-633.000.

Dreissigacker, Peter D.; and Dreissigacker, Richard A., to Concept II, Inc. Energy absorbing means with self calibrating monitor. 4,875,674, Cl. 272-72.000.

Dreissigacker, Richard A.: *See*—
Dreissigacker, Peter D.; and Dreissigacker, Richard A., 4,875,674, Cl. 272-72.000.

Drent, Eit, to Shell Oil Company. Process for the preparation of alkanediols. 4,876,401, Cl. 568-861.000.

Drent, Eit: *See*—
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,876,286, Cl. 518-700.000.

Dresser Industries, Inc.: *See*—
Langford, James W., Jr., 4,875,532, Cl. 175-371.000.

Drewitz, Hans: *See*—
Hagin, Faust; Drewitz, Hans; and Krenner, Manfred, 4,875,557, Cl. 188-79.550.

Dryzga, Craig D.: *See*—
Meister, Bernard J.; Dryzga, Craig D.; and Tien, Li C., 4,876,312, Cl. 525-263.000.

Dubal, Hans-Rolf: *See*—
Hemmerling, Wolfgang; Dubal, Hans-Rolf; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,876,028, Cl. 252-299.610.

Duce, Edward, to Stockrail Ltd. Endless path storage carousel with selective discharge. 4,875,416, Cl. 104-167.000.

Duck, Peter; Bender, Robert; Crosby, William; and Robertson, John G., to Meiogenics, Inc. Nucleic acid compositions with scissile linkage useful for detecting nucleic acid sequences. 4,876,187, Cl. 435-6.000.

Duhamel, Lucette; and Duhamel, Pierre, to Rhone-Poulenc Sante. 1,3,5-nonatriene derivatives, their preparation and their use. 4,876,370, Cl. 549-455.000.

Duhamel, Pierre: *See*—
Duhamel, Lucette; and Duhamel, Pierre, 4,876,370, Cl. 549-455.000.

Duncan, David J.: *See*—
Cavitt, Michael B.; and Duncan, David J., 4,876,295, Cl. 523-172.000.

Duncan, Richard C., to Allanson, Division of Jannock Limited. Current supplying device. 4,876,496, Cl. 320-31.000.

Duncan, Scott M.: *See*—
Santos, Alfred J.; Cook, Frederick A., Jr.; Duncan, Scott M.; and Moseley, John, 4,875,785, Cl. 384-448.000.

Dunlop Limited a British Company: *See*—
Moore, Alan F., 4,875,664, Cl. 267-140.100.

Dunnavant, William R.: *See*—
Shriver, H. Randall; Dunnavant, William R.; and Gruber, Bruce A., 4,876,294, Cl. 523-139.000.

Dunnigan, Jacques; and Menard, Hugues, to L'Institut De L'Amiante. Filter for removing cancer causing compounds from exhaust fumes. 4,875,910, Cl. 55-74.000.

Du Pont de Nemours, E. I., and Company: *See*—
Fischer, Gerhard; and Quabeck, Helmut, 4,876,611, Cl. 358-456.000.
Fremont, Joseph M., 4,876,231, Cl. 502-174.000.
Heikkila, Kurt E.; Williams, Rodney K.; and Bohnen, Bruce A., 4,875,973, Cl. 156-664.000.
Myers, Melvyn J.; and Nickolson, Victor J., 4,876,259, Cl. 514-256.000.
Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., 4,876,269, Cl. 514-429.000.
Sakiadis, Byron C., 4,875,279, Cl. 29-740.000.
Williams, Rodney K.; Bohnen, Bruce A.; and Heikkila, Kurt E., 4,875,972, Cl. 156-664.000.
Zafiroglu, Dimitri P., 4,876,128, Cl. 428-102.000.

Dupuis, Christine: *See*—
Grollier, Jean F.; and Dupuis, Christine, 4,876,083, Cl. 424-47.000.

Durgo AG: *See*—
J100 rgensen, Paul R., 4,876,555, Cl. 343-895.000.

Durham, Harold S.: *See*—
Schlesch, Ronald D.; Armstrong, Merrill H.; Vallery, Stafford J.; and Durham, Harold S., 4,875,428, Cl. 114-255.000.

Durney, Cronin Rebecca L.; Rutherford W. Scott; and Campbell, James F., to Reichhold Chemicals, Inc. Textile adhesives comprising a latex binder consisting essentially of styrene, butadiene, and monoester of maleic or fumatic acid. 4,876,293, Cl. 523-122.000.

Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, to BASF Aktiengesellschaft. Naphtholactam dyes and optical recording medium containing these days. 4,876,356, Cl. 548-419.000.

Dusza, John P.: *See*—
Torley, Lawrence W.; Johnson, Bernard D.; and Dusza, John P., 4,876,252, Cl. 514-224.800.

Dutcher, James C.: *See*—
Plitt, Cheryl A.; and Dutcher, James C., 4,875,882, Cl. 440-66.000.

Dyck, Rudolph H.; and Kim, Jae S., to Sangamo-Weston, Incorporated. Grooved Schottky barrier photodiode for infrared sensing. 4,876,586, Cl. 357-30.000.
Dykstra, Richard A., to Briggs & Stratton Corporation. Cyclic responding electronic speed governor. 4,875,448, Cl. 123-352.000.
Dynamics Research Corporation: *See—*
Bakewell, Joseph J., 4,875,281, Cl. 29-825.000.
Dynascan Corporation: *See—*
Rogers, Max W.; and Skinner, Daniel R., 4,876,709, Cl. 379-61.000.
Dziurla, Heinz-Jurgen; Freitag, Dieter; Waldenrath, Werner; Burkhardt, Claus; and Schulte, Bernhard, to Bayer Aktiengesellschaft. Moulded bodies containing carbon. 4,876,033, Cl. 252-511.000.
E. F. Johnson Company: *See—*
Grindahl, Mervin L., 4,876,700, Cl. 375-87.000.
E.R.C.D. Industries Inc.: *See—*
Da Silva, Jean, 4,875,509, Cl. 141-38.000.
E-Systems, Inc.: *See—*
Masheff, Michael S., 4,876,549, Cl. 342-417.000.
Eakin, Oscar, Jr.: *See—*
Merrett, Ronald G.; and Eakin, Oscar, Jr., 4,875,811, Cl. 406-39.000.
Eakin, Thomas G. Incontinence device for women. 4,875,898, Cl. 604-331.000.
Earl, Gary W.: *See—*
Hughes, Leonard; Fuller, James G.; and Earl, Gary W., 4,876,355, Cl. 548-352.000.
Eastlick, David T.: *See—*
Robinson, Colin; Eastlick, David T.; and Bownass, Audrey J., 4,876,351, Cl. 548-204.000.
Eastman Christensen Company: *See—*
Biehl, Johann; and Ostertag, Alfred, 4,875,531, Cl. 175-250.000.
Eastman Kodak Company: *See—*
Beach, David E., 4,875,637, Cl. 242-71.100.
Buckland, Paul R., 4,876,182, Cl. 430-555.000.
Byers, Gary W.; and Chapman, Derek D., 4,876,237, Cl. 503-227.000.
Chen, Chin H.; Fox, John L.; Specht, Donald P.; and Farid, Samir Y., 4,876,175, Cl. 430-281.000.
DeBoer, Charles D., 4,876,235, Cl. 503-227.000.
DeGrave, Gilbert F., 4,875,262, Cl. 29-121.800.
Estes, Marvin F.; and Lungershausen, Arnold W., 4,875,756, Cl. 350-96.200.
Harvey, Donald M., 4,875,638, Cl. 242-71.100.
Henzel, Richard P., 4,876,234, Cl. 503-227.000.
Hsu, Kevin; Rao, Srinivas T.; and Kaukeinen, Joseph Y., 4,875,969, Cl. 156-633.000.
Mack, Arthur R., II; and Sutherland, John W. H., Jr., 4,876,207, Cl. 436-135.000.
Marino, Philip F.; and Vandenberg, Donald E., 4,875,764, Cl. 350-611.000.
Moran, Kevin E.; Smith, Michael L.; and Lippard, Ernest R., III, 4,875,780, Cl. 356-446.000.
Parulski, Kenneth A., 4,876,590, Cl. 358-41.000.
Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, 4,876,181, Cl. 430-522.000.
Sherburne, David G., 4,875,671, Cl. 271-302.000.
Shin, Sung-Chul, 4,876,159, Cl. 428-607.000.
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.
Vandenberg, Donald E.; Jacques, Donald A.; and Schaffer, William E., 4,875,765, Cl. 350-611.000.
Vanier, Noel R.; and Lum, Kin K., 4,876,236, Cl. 503-227.000.
Vanier, Noel R.; and Lum, Kin K., 4,876,238, Cl. 503-227.000.
Van Sickle, Dale E., 4,876,378, Cl. 560-78.000.
Wake, Ronald W.; Reithel, Sibylle L.; and McGuckin, Hugh G., 4,876,166, Cl. 430-7.000.
Whitfield, Arthur A., 4,876,697, Cl. 375-22.000.
Eaton Corporation: *See—*
Calviello, Joseph A.; Bie, Paul R.; and Pomian, Ronald J., 4,876,176, Cl. 430-311.000.
Storm, Eric L., 4,875,796, Cl. 403-359.000.
Eaton, Richard B., to Xerox Corporation. Focus and signal to noise measurement routines in input scanners. 4,876,608, Cl. 358-443.000.
Ebara Corporation: *See—*
Ohkubo, Kazuo; Hayashi, Tadamasa; and Nagai, Hiroshi, 4,876,006, Cl. 210-321.690.
Eberhard, John: *See—*
Willkop, Franz; Zahring, Gerhard; Rutsch, Robert; Popp, Joachim; and Eberhard, John, 4,875,828, Cl. 415-173.400.
Ebonite International, Inc.: *See—*
Lee, Andrew J.; Sanduja, Mohan L.; Sugathan, Kenneth; Dragnea, Felicia; and Horowitz, Carl, 4,875,410, Cl. 101-170.000.
Ebonwood Limited: *See—*
Griffiths, Colin; and Walker, William G., 4,875,954, Cl. 156-64.000.
Edward W. Face Co., Inc., The: *See—*
Face, Samuel A., III, 4,875,802, Cl. 404-67.000.
Edwards, John W.: *See—*
Dekker, Nicolaas M. J.; Edwards, John W.; and James, Adrian W., 4,876,722, Cl. 381-71.000.
Egawa, Akira, to Fanuc Ltd. Output voltage detecting device in a laser oscillator. 4,876,689, Cl. 372-38.000.
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, to Kabushiki Kaisha Toshiba. Recording apparatus. 4,876,560, Cl. 346-153.100.
Eichen, Howard R., to Treestone Corporation. Building material and method of producing the building material. 4,876,151, Cl. 428-446.000.
Eisai Co., Ltd.: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.
Eitai, Kazuo: *See—*
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,875,835, Cl. 417-295.000.
Ejiri, Takashi: *See—*
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.
Ekeroth, Douglas E.; and Veronesi, Luciano, to Westinghouse Electric Corp. Resiliently loaded lateral supports for cantilever-mounted rod guides of a pressurized water reactor. 4,876,061, Cl. 376-353.000.
Elco Industries, Inc.: *See—*
Reinwall, Ernest W., 4,875,818, Cl. 411-369.000.
Elder, Jerome E.; and Mosman, Nancy L., to Minnesota Mining and Manufacturing Company. Disc dispenser. 4,875,609, Cl. 225-13.000.
Electronic Research Group, Inc.: *See—*
Silva, Donald M.; Silva, Leroy F.; and Fehsenfeld, Fred M., Sr., 4,876,638, Cl. 363-97.000.
Electronics, Inc.: *See—*
Brint, Gary T.; Bungardt, Gabriele; Gedecke, Jerel C.; Harris, Robert L.; and Kraz, Vladimir, 4,876,712, Cl. 379-387.000.
Eli Lilly and Company: *See—*
Hamill, Robert L.; and Yao, Raymond C., 4,876,273, Cl. 514-451.000.
Robertson, David W.; and Wong, David T., 4,876,282, Cl. 514-554.000.
Elisabet, Ingrid Birgitta, nee Jansson, Eva Christina Holm, Claes Frederick Holm, executors: *See—*
Holm, Sune, deceased; Malmberg, Rolf; and Svensson, Kjell, 4,876,100, Cl. 426-491.000.
Elliott, Raymond; Griffin, David A.; and Gairns, Raymond S., to Imperial Chemical Industries PLC. Pyrimidine derivatives. 4,875,922, Cl. 71-76.000.
Ellis, Roger D.: *See—*
Wigglesworth, Paul; and Ellis, Roger D., 4,876,038, Cl. 261-152.000.
Elms, Robert T.: *See—*
Verbanets, William R.; and Elms, Robert T., 4,876,502, Cl. 324-115.000.
Elpatronic AG: *See—*
Becker, Anton; and Kramer, Felix, 4,875,382, Cl. 74-84.00R.
Elron Electronic Industries, Ltd.: *See—*
Orbach, Zvi; and Janai, Meir I., 4,875,971, Cl. 156-644.000.
Emamjomeh, Ali: *See—*
Hilton, Robert; Emamjomeh, Ali; and Belani, Jagdish, 4,876,587, Cl. 357-70.000.
Emery, Leslie M. Miniature forge. 4,875,854, Cl. 432-120.000.
Emhart Industries, Inc.: *See—*
Gardner, E. Boyd, 4,876,652, Cl. 364-473.000.
Miller, Theodore H., deceased; and Slusarski, Ronald S., 4,875,722, Cl. 292-92.000.
Emonds-Alt, Xavier: *See—*
Breliere, Jean C.; Emonds-Alt, Xavier; and Garcia, Georges, 4,876,248, Cl. 514-108.000.
Enamito, Satoshi: *See—*
Arai, Yoshimasa; Enamito, Satoshi; and Oda, Noriyuki, 4,875,335, Cl. 60-274.000.
Endl, Josef: *See—*
Schetters, Hartmut; Endl, Josef; and Albert, Winfried, 4,876,189, Cl. 435-7.000.
Endo, Azuchi: *See—*
Yamaguchi, Kiyoshi; Endo, Azuchi; and Sakamoto, Kiichiro, 4,876,567, Cl. 355-20.000.
Endo, Haruyoshi; Misaizu, Kouei; and Makimoto, Mitsuo, to Matsushita Electric Industrial Co., Ltd. Mixer with rat race circuit. 4,876,744, Cl. 455-326.000.
Endo, Katsuo; and Makino, Masahiro, to Sony Corporation. Screw for inseparably joining cassette members. 4,875,641, Cl. 242-199.000.
Endo, Masanori; and Watanabe, Kouichi, to Murata manufacturing Co., Ltd. Electric double layer capacitor. 4,876,631, Cl. 361-502.000.
Endoh, Shigeki: *See—*
Mizutani, Futoshi; Kyogoku, Takeshi; Saitoh, Tatsuo; and Endoh, Shigeki, 4,875,918, Cl. 65-3.120.
Energy Conversion Devices, Inc.: *See—*
Ross, Randall R.; Bjornard, Eric; and Strand, David, 4,876,667, Cl. 365-113.000.
Engel, Hartmunt S. Lighting system. 4,876,633, Cl. 362-223.000.
Engel, James F.; Byerley, Thomas J.; and Christie, Howard W., to Midwest Research Institute. α-substituted acrylic acid esters, their polymers and method of synthesizing same. 4,876,323, Cl. 526-310.000.
Engineered Air Systems, Inc.: *See—*
Mutchler, Paul A., 4,875,851, Cl. 431-6.000.
Enomoto, Michiyo; and Riisgaard, Steen, to Novo Industri A/S. Enzymatic detergent additive, a detergent, and a washing method. 4,876,024, Cl. 252-174.120.
ENSCO. Inc.: *See—*
Kesler, John K.; McCown, Robert J.; and Shia, John J., 4,875,366, Cl. 73-118.100.

Ensyn Engineering Associates Inc.: *See*—
Underwood, Gary; and Graham, Robert G., 4,876,108, Cl. 426-650.000.

EPS Environmental Protection Systems Limited: *See*—
Roydhouse, Richard H., 4,876,025, Cl. 252-182.320.

Equipments Et Composants Pour L'Industrie Automobile: *See*—
Henigue, Christian, 4,875,387, Cl. 74-552.000.

Era, Koh: *See*—
Mishima, Osamu; Yamaoka, Shinobu; Fukunaga, Osamu; Tanaka, Junzo; and Era, Koh, 4,875,967, Cl. 156-605.000.

Erickson, Curtis, to 501 Hydrosplash Enterprises, Inc. Aquatic exercise device. 4,875,673, Cl. 272-71.000.

Erickson, Frederick L.: *See*—
Richeson, William E.; and Erickson, Frederick L., 4,875,441, Cl. 123-90.130.

Erntell, Mats: *See*—
Bjorck, Lars; Erntell, Mats; and Myhre, Erling, 4,876,194, Cl. 435-68.000.

Erwin Sick GmbH Optik-Electronik: *See*—
Fetzer, Gunter, 4,875,761, Cl. 350-171.000.

Eshita, Takashi; Mieno, Fumitake; Furumura, Yuji; and Watanabe, Takuya, to Fujitsu Limited. Method of forming a heteroepitaxial semiconductor thin film using amorphous buffer layers. 4,876,219, Cl. 437-126.000.

Esmark Apparel, Inc.: *See*—
Browder, George A. G., Jr.; and Grant, David W., 4,875,241, Cl. 2-409.000.

Essex Group, Inc.: *See*—
Lavallee, Francois A., 4,876,316, Cl. 525-427.000.

Estes, Marvin F.; and Lungershausen, Arnold W., to Eastman Kodak Co. Fresnel lens apparatus for optically coupling a plurality of data channels. 4,875,756, Cl. 350-96.200.

Etheridge, David R. Method of connecting a non-contaminating fluid heating element to a power source. 4,875,957, Cl. 156-85.000.

Ethyl Petroleum Additives, Inc.: *See*—
Lam, William Y., 4,876,375, Cl. 558-235.000.

Etoh, Masahiro: *See*—
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.

Euchner, James: *See*—
Loris, Keith; and Euchner, James, 4,876,731, Cl. 382-40.000.

Eur-Control Kalle AB: *See*—
Skallen, Bengt, 4,875,362, Cl. 73-54.000.

European Economic Community: *See*—
Murray, Charles N.; and Jamet, Michel R., 4,875,429, Cl. 114-331.000.

Euskirchen, Jurgen: *See*—
Laucht, Horst; and Euskirchen, Jurgen, 4,876,448, Cl. 250-234.000.

Evans, Vernon C.; and Heidinger, George H., to Peabody Coal Company. Switching and testing system. 4,876,514, Cl. 324-556.000.

Evans, Walter R.; Remenicky, Joseph M.; Jasper, Thomas E.; and Ballard, Wayne W., to Sargent & Greenleaf, Inc. Electronic time lock. 4,875,351, Cl. 70-271.000.

Evasick, Edward J.: *See*—
Evasick, Robert J.; and Evasick, Edward J., 4,875,451, Cl. 123-435.000.

Evasick, Robert J.; and Evasick, Edward J. Diesel tune up method. 4,875,451, Cl. 123-435.000.

Ewal Manufacturing Co., Inc.: *See*—
Aldridge, Lewis L., 4,875,404, Cl. 92-130.00A.

Ewert, Warren M.; Kubicek, Donald H.; and Drake, Charles A., to Phillips Petroleum Company. Catalyst support, and catalyst for olefin dimerization. 4,876,410, Cl. 585-516.000.

Ewing, Sheldon M.: *See*—
Tuttle, John E.; and Ewing, Sheldon M., 4,875,599, Cl. 221-231.000.

Exxon Chemical Patents Inc.: *See*—
Cohen, Abraham D.; Diana, William D.; and Baiel, James J., 4,876,403, Cl. 568-913.000.

Exxon Production Research Company: *See*—
Kroeger, Michael K.; Longo, John M.; Steiger, Ronald P.; and Leung, Peter K., 4,876,512, Cl. 324-376.000.

Exxon Research and Engineering Company: *See*—
Hamner, Glen P., 4,875,992, Cl. 208-89.000.
Yeh, Chuen Y.; and Savini, Charles, 4,876,392, Cl. 568-404.000.

Ezaki, Tadashi: *See*—
Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, 4,876,451, Cl. 361-540.000.

Fabian, Josef: *See*—
Maurer, Albrecht; and Fabian, Josef, 4,876,727, Cl. 382-8.000.

Face, Samuel A., III, to Edward W. Face Co., Inc., The. Installational concrete joint insert and method of preventing edge spalling. 4,875,802, Cl. 404-67.000.

Factor, Arnold: *See*—
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,876,309, Cl. 524-109.000.

Falconer, Donald R.; and Sneddon, James C., to Universal Industrial Products., a Division of Core Industries, Inc. Self-closing invisible hinge with selectively variable closing force. 4,875,252, Cl. 16-288.000.

Famcy Steel Corporation: *See*—
Wan, Chi-Meen, 4,875,933, Cl. 75-10.170.

Fan, Liang-Tseng: *See*—
Somerville, Robin; and Fan, Liang-Tseng, 4,875,905, Cl. 44-589.000.

Fang, Jimmy, to Fei, Peter Tsung-Hou. Loudspeaker system. 4,876,723, Cl. 381-182.000.

Fanuc Ltd.: *See*—
Egawa, Akira, 4,876,689, Cl. 372-38.000.

Farid, Samir Y.: *See*—
Chen, Chin H.; Fox, John L.; Specht, Donald P.; and Farid, Samir Y., 4,876,175, Cl. 430-281.000.

Farmitalia Carlo Erba S.r.l.: *See*—
Longo, Antonio; and Lombardi, Paolo, 4,876,045, Cl. 260-397.300.

Faroudja, Yves C. Film-to-video converter with scan line doubling. 4,876,596, Cl. 358-140.000.

Farque, Claude A., to Oil Dynamics, Inc. Parameter telemetering from the bottom of a deep borehole. 4,876,539, Cl. 340-856.000.

Farr, Barbara J.: *See*—
Ardini, Joseph L.; Lefsky, Brian; and Farr, Barbara J., 4,876,501, Cl. 324-73.00R.

Farrar, David: *See*—
Benn, Gerald; Farrar, David; and Flesher, Peter, 4,876,047, Cl. 562-41.000.

Fasold, Dietmar: *See*—
Nathrath, Norbert; and Fasold, Dietmar, 4,876,553, Cl. 343-756.000.

Faulk, Michael B.: *See*—
Trahan, David O.; and Faulk, Michael B., 4,876,017, Cl. 252-8.510.

Faust, James H., to ABC Auto Alarms, Inc. Push lock actuable anti-theft vehicle device. 4,875,350, Cl. 70-241.000.

FBK International Corporation: *See*—
Quackenbush, John, 4,876,140, Cl. 428-216.000.

Fearing, Craig F.: *See*—
Orsburn, Michael L.; Hemsky, Robert L.; Tucker, Terry L.; Schwarz, Robert E.; and Fearing, Craig F., 4,876,589, Cl. 358-22.000.

Feeney, Robert D.; Prosise, Robert L.; McGrady, Joseph; and Niehoff, Raymond L., to Procter & Gamble Company, The. Potato based dough containing highly pectinated cellulosic fibers. 4,876,102, Cl. 426-550.000.

Fehsenfeld, Fred M., Sr.: *See*—
Silva, Donald M.; Silva, Leroy F.; and Fehsenfeld, Fred M., Sr., 4,876,638, Cl. 363-97.000.

Fei, Peter Tsung-Hou: *See*—
Fang, Jimmy, 4,876,723, Cl. 381-182.000.

Feigenbaum, Jeffery J.: *See*—
Mechoulam, Raphael; Feigenbaum, Jeffery J.; Lander, Naphtali; and Srebnik, Morris, 4,876,276, Cl. 514-454.000.

Feinstein, Joseph, to Varian Associates, Inc. Short-period electron beam wiggler. 4,876,687, Cl. 372-2.000.

Feldman, Fred; Klekamp, Mark S.; Hrinda, Michael E.; Shaw, Arthur B.; and Chandra, Sudhish, to Armour Pharmaceutical Company. Stabilization of biological and pharmaceutical products during thermal inactivation of viral and bacterial contaminants. 4,876,241, Cl. 514-2.000.

Felice, Ralph A.: *See*—
Gardner, Bronson; Keener, Melvin E.; DeSutter, Steven C.; Jagatich, Carl T.; and Felice, Ralph A., 4,876,647, Cl. 364-420.000.

Ferco International: *See*—
Kautt, Jean-Jacques, 4,875,727, Cl. 292-337.000.

Fero, Arnold H.; Potochnik, Lawrence M.; Riling, Ronald W.; and Semethy, Kenneth F., to Westinghouse Electric Corp. Nuclear power generating station equipment qualification method and apparatus. 4,876,058, Cl. 376-247.000.

Ferrari, Vincenzo: *See*—
Alota, Santa; Ferrari, Vincenzo; Memmi, Massimo; Pacelli, Leonardo; and Ramundo, Susanna, 4,875,983, Cl. 204-28.000.

Ferren, Robert C. Lamp device. 4,875,852, Cl. 431-324.000.

Ferrero, Jean-Pierre: *See*—
Bernard, Patrice; Sauvage, Laurent; Girard, Henri; and Ferrero, Jean-Pierre, 4,876,057, Cl. 376-216.000.

Fetiveau, Jean Y. L., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA". Compressor rotor blade having a tip with asymmetric lips. 4,875,831, Cl. 416-228.000.

Fetzer, Gunter, to Erwin Sick GmbH Optik-Electronik. Light curtain apparatus. 4,875,761, Cl. 350-171.000.

Fiat Auto S.p.A.: *See*—
Barbero, Mario, 4,875,307, Cl. 49-374.000.
Giacosa, Dante, 4,875,893, Cl. 474-28.000.

Fidrych, Stephen: *See*—
Welch, Glenn S.; Fidrych, Stephen; Romm, Michael; and Maurer, Bernie J., 4,875,880, Cl. 439-536.000.

Field, Bruce F., to Tennant Company. Protection from extraneous light for light guided vehicle. 4,876,444, Cl. 250-214.0AL.

Filbert, Norman V. Method of making a mortar binder and product. 4,875,938, Cl. 106-120.000.

Filtration Water Filters For Agriculture and Industry, Ltd.: *See*—
Barzuza, Ytshak, 4,875,913, Cl. 55-294.000.

Finch, Jack A., to ACCRA Manufacturing Co. Windage locking apparatus for an archery bow sight. 4,875,290, Cl. 33-265.000.

Finney, James E.; and Brubaker, Weldon L., to Molex Incorporated. Carrier assembly and method of manufacturing same. 4,875,582, Cl. 206-330.000.

Fiock, Thomas P. Toggling speakerswitch. 4,876,459, Cl. 307-11.000.

Fischer, Gerhard; and Quabeck, Helmut, to Du Pont de Nemours, E. I., and Company. Process for recording semihalftone images. 4,876,611, Cl. 358-456.000.

Fischer, Glenn N. Guided-bend test apparatus. 4,875,376, Cl. 73-852.000.

Fischer, Richard L.: *See—*
Caveny, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 4,875,881, Cl. 439-535.000.

Fischer, Sandra K.: *See—*
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.

fischerwerke Artur Fischer GmbH & Co. KG: *See—*
Nehl, Wolfgang, 4,875,578, Cl. 206-309.000.

Fisher, Abraham; and Karton, Ishai, to State of Israel, Israel Institute of Biological Research. Oxathiolanes. 4,876,260, Cl. 514-278.000.

Fisher, John L.: *See—*
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.

Fisher/Sauls Electronics, Inc.: *See—*
Sauls, Charles L., 4,876,532, Cl. 340-689.000.

Fitton, Stephen, to Neo Electronics Limited. Coin validation device. 4,875,567, Cl. 194-318.000.

Fitzner, Arthur O., to Brunswick Corporation. Apparatus and method for protecting engine electronics from radio frequency interference. 4,875,457, Cl. 123-633.000.

Fjare, Douglas E.: *See—*
Chiang, Weilong L.; Fjare, Douglas E.; and Nowicki, Neal R., 4,876,329, Cl. 528-353.000.

Flaakt AB: *See—*
Ziemer, Wolf, 4,875,360, Cl. 73-40.700.

Flachenecker, Gerhard: *See—*
Lindenmeier, Karl-Heinz G.; and Flachenecker, Gerhard, 4,876,743, Cl. 455-133.000.

Fleak, David S.; Koegel, Keith S.; Long, William B.; Moist, Stanford C., Jr.; and Nauman, Warren D., to AMP Incorporated. Discrete cable assembly. 4,875,877, Cl. 439-497.000.

Fleckenstein, Phillip P., to Silomaster, Inc. Drop-weight material level indicator. 4,875,295, Cl. 33-720.000.

Flesher, Peter: *See—*
Benn, Gerald; Farrar, David; and Flesher, Peter, 4,876,047, Cl. 562-41.000.

Flonic: *See—*
Berthon, Patrick; and Guion, Christian, 4,876,540, Cl. 340-932.200.

Flood, Mark A.: *See—*
Bittorf, Bradley J.; Flood, Mark A.; Kalan, Michael D.; and Sepsi, Robert R., 4,876,664, Cl. 364-900.000.

Floyd, Thomas O.: *See—*
Haque, Sazzadul; Floyd, Thomas O.; Savas, Nick; and Kelm, Walter H., 4,875,812, Cl. 407-104.000.

Flux Gerate GmbH: *See—*
Gschwender, Alois; Kruger, Horst; and Schleifer, Bernhard, 4,875,827, Cl. 415-111.000.

Flynn, John P. P., to Powerchute Systems International Inc. Light aircraft with parachute wing. 4,875,642, Cl. 244-13.000.

FMC Corporation: *See—*
Peake, Clinton J., 4,876,285, Cl. 514-746.000.

Foley, Daniel M.; Snyder, Michael D.; and Long, John D., to Deere & Company. Dual implement hitch assembly. 4,875,527, Cl. 172-248.000.

Ford New Holland, Inc.: *See—*
Margerum, Edwin O.; and Strong, Russell W., 4,875,890, Cl. 460-68.000.

Forestier, Guy, to Clecim. Closure device with cleaning of a pouring hole. 4,875,663, Cl. 266-272.000.

Forestier, Serge: *See—*
Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, 4,876,381, Cl. 560-56.000.

Forrest, Stephen R., to U.S.C. Method of making avalanche photodiode. 4,876,209, Cl. 437-5.000.

Fortenberry, William R.: *See—*
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.

Fortin, Rejean: *See—*
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, 4,876,246, Cl. 514-80.000.

Fory, Werner: *See—*
Schurter, Rolf; Meyer, Willy; and Fory, Werner, 4,875,923, Cl. 71-92.000.

Fosroc International Limited: *See—*
Viles, Robert F., 4,875,937, Cl. 106-104.000.

Foster, Larry L. Method of cutting metal stud and bending and securing same to form angel member. 4,875,274, Cl. 29-525.100.

Foulletier, Louis, to PCUK-Produits Chimiques Ugine Kuhlmann. Process for gaseous phase fluorination of aliphatic chlorinated or chlorofluorinated hydrocarbons. 4,876,406, Cl. 570-165.000.

Fourcadier, Chantal: *See—*
Grollier, Jean F.; and Fourcadier, Chantal, 4,876,085, Cl. 424-47.000.

Fournier, Bernard, to La Telemecanique Electrique. Device for rendering contactors electrically and mechanically inoperative. 4,876,418, Cl. 200-50.00C.

Fox, Carol A.: *See—*
Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., 4,876,169, Cl. 430-110.000.

Fox, Clarence D., to Borg-Warner Corporation. Proportional solenoid valve. 4,875,499, Cl. 137-82.000.

Fox, Daniel W.: *See—*
Blackmon, Kenneth P.; Clagett, Donald C.; Fox, Daniel W.; Maresca, Louis M.; and Shafer, Sheldon J., 4,876,317, Cl. 525-433.000.

Fox, John L.: *See—*
Chen, Chin H.; Fox, John L.; Specht, Donald P.; and Farid, Samir Y., 4,876,175, Cl. 430-281.000.

Fox, Leslie Z. Ballast for ionic conduction lamps. 4,876,485, Cl. 315-244.000.

Fox, Steve A., to Normag Corporation. Automated temperature probe apparatus and method. 4,875,782, Cl. 374-148.000.

Fragnito, Frank. Chain driven, continuously infinite variable speed transmission system. 4,875,389, Cl. 74-689.000.

Fram, Craig F.: *See—*
Norton, Edward J.; Fram, Craig F.; Graham, Kenneth W.; and Smith, James A., 4,876,053, Cl. 264-255.000.

Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, to Bayer Aktiengesellschaft. Circulation-active substituted 5-nitro-1,4-dihydropyridines. 4,876,254, Cl. 514-252.000.

Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, to Bayer Aktiengesellschaft. Substituted 1,4-dihydropyridines for control of circulation and thromboses. 4,876,255, Cl. 514-252.000.

Franco, Maurice, to Lockheed Corporation. M.T.I. radar system. 4,876,547, Cl. 342-160.000.

Frank, Jeffrey B.: *See—*
Panique, Kenneth L.; and Frank, Jeffrey B., 4,875,291, Cl. 33-293.000.

Frantz, Leo R.; Bauer, Alfred; Koran, Matthew H.; and Becker, Jack, to Actron Manufacturing Company. Multiple position rotary switch. 4,876,416, Cl. 200-11.00R.

Frazier, Marvin E.; Mallavia, Louis P.; Baca, Oswald G.; and Samuel, James E., to Battelle Development Corporation. Detection and differentiation of coxiella burnetii in biological fluids. 4,876,186, Cl. 435-6.000.

Fred Hutchinson Cancer Research Center: *See—*
Hakamori, Sen-Itiroh, 4,876,199, Cl. 530-387.000.

Freiberg, Helge: *See—*
van Wersch, Kurt; Freiberg, Helge; and Mevissen, Peter, 4,875,942, Cl. 134-15.000.

Freitag, Dieter: *See—*
Dziurla, Heinz-Jurgen; Freitag, Dieter; Waldenrath, Werner; Burkhardt, Claus; and Schulte, Bernhard, 4,876,033, Cl. 252-511.000.

Freitag, Helmut: *See—*
Deneke, Ulfert; Nagel, Rolf; Rothe, Anselm; and Freitag, Helmut, 4,876,067, Cl. 422-56.000.

Fremont, Joseph M., to Du Pont de Nemours, E. I., and Company. Process for preparing crystalline malachite. 4,876,231, Cl. 502-174.000.

Fridman, Vladimir M.: *See—*
Khutoretsky, Garri M.; Tjurin, Jury G.; Varshavsky, Vladimir D.; Zagorodnaya, Galina A.; and Fridman, Vladimir M., 4,876,469, Cl. 310-52.000.

Friedrich, Steven G.: *See—*
Lulham, Cedric M.; Wofford, George D.; Bradfute, John G.; and Friedrich, Steven G., 4,875,587, Cl. 206-484.000.

Friesen, Dwayne T.: *See—*
Babcock, Walter C.; and Friesen, Dwayne T., 4,876,287, Cl. 521-28.000.

Frink, Tommy S.; Reed, Lowell M.; Cochran, Dwayne V.; and McNair, Will L., to Parker Technology, Inc. Automatic drilling system. 4,875,530, Cl. 175-27.000.

Fritsche-Mollmann GmbH & Co.: *See—*
Onnenberg, Volker; and Mollmann, Gunter, 4,875,843, Cl. 425-4.00R.

Fry, Arthur C.: *See—*
Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Matthews, Brian; and Peters, Michaels S., 4,875,646, Cl. 244-190.000.

Fuchizawa, Tetsuro: *See—*
Tamagawa, Shigehisa; Kuroishi, Masayuki; and Fuchizawa, Tetsuro, 4,876,170, Cl. 430-138.000.

Fuentes, Ricardo I. Silicon carbide sintering. 4,876,226, Cl. 501-89.000.

Fuhrer, Wolfgand; Kuhle, Engelbert; Adler, Alfons; and Hanssler, Gerd, to Bayer Aktiengesellschaft. Trisubstituted 1,3,5-triazine-2,4,6-triones. 4,876,253, Cl. 514-241.000.

Fuji Electric Co., Ltd.: *See—*
Miyagawa, Michiaki; Ishizaka, Yutaka; and Shimomura, Shoji, 4,876,732, Cl. 382-41.000.

Fuji Electric Corporate Research and Development, Ltd.: *See—*
Yoshida, Takashi, 4,875,944, Cl. 136-249.000.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Abe, Kunihoro, 4,875,453, Cl. 123-440.000.
Oshita, Saiichiro; Mouri, Toyohiko; and Takahaski, Tsutomu, 4,875,540, Cl. 180-79.100.
Oshita, Saiichiro; Mouri, Toyohiko; Takahashi, Tsutomu; and Itou, Shinji, 4,875,541, Cl. 180-79.100.
Uchiyama, Shintaro, 4,875,698, Cl. 180-233.000.

Fuji Photo Film Co.: *See—*
Muramatsu, Akira, 4,876,591, Cl. 358-43.000.

Fuji Photo Film Co., Ltd.: *See—*
Abe, Akira; Nakajima, Junya; Takase, Haruo; Uenaka, Kazushige; and Otomo, Ruyzi, 4,876,180, Cl. 430-393.000.
Akao, Mutsuo; Osanai, Hiroyuki; and Inoue, Koji, 4,876,125, Cl. 428-35.200.
Akao, Mutsuo, 4,876,129, Cl. 428-359.000.
Hirai, Hiroyuki, 4,876,171, Cl. 430-203.000.

Horikawa, Kazuo, 4,876,452, Cl. 250-327.200.
Ishikawa, Takatoshi; and Yagihara, Morio, 4,876,174, Cl. 430-380.000.
Kawamura, Kazushige, 4,876,734, Cl. 382-54.000.
Kitamoto, Tatsuji; Yokoyama, Katsuya; and Sekiguchi, Takuji, 4,875,610, Cl. 226-10.000.
Maemoto, Kazuo; Iwasaki, Masayuki; Maeda, Minoru; and Aotani, Yoshimasa, 4,876,173, Cl. 430-271.000.
Miyasaka, Tsutomu; Okazaki, Masaki; and Sugimoto, Tadao, 4,876,183, Cl. 430-567.000.
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.
Nishitoku, Yukitsugu, 4,876,569, Cl. 355-68.000.
Ohara, Yuji, 4,876,556, Cl. 346-108.000.
Ozaki, Hiroyuki; and Kawata, Ken, 4,876,184, Cl. 430-607.000.
Ozawa, Yoshio; Yamamoto, Takashi; Shigaki, Takao; and Kaneko, Rokusaburo, 4,876,568, Cl. 355-56.000.
Saeki, Keiso; Sano, Shojiro; Matsuoka, Katsumi; Takashima, Masanobu; and Iwakura, Ken, 4,876,233, Cl. 503-209.000.
Tajima, Kenji, 4,876,706, Cl. 378-174.000.
Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, 4,876,161, Cl. 428-691.000.
Tamagawa, Shigehisa; Kuroishi, Masayuki; and Fuchizawa, Tetsuro, 4,876,170, Cl. 430-138.000.
Yabe, Masao, 4,876,557, Cl. 346-137.000.
Yamaguchi, Kiyoshi; Endo, Azuchi; and Sakamoto, Kiichiro, 4,876,567, Cl. 355-20.000.
Yamazaki, Nobuo; and Kitamoto, Tatsuji, 4,876,022, Cl. 252-62.560.
Yasunaga, Tadashi; and Sasazawa, Koji, 4,876,113, Cl. 427-39.000.

Fuji Xerox Co., Ltd.: *See*—
Ozawa, Takashi, 4,876,585, Cl. 357-24.000.

Fujii, Hiroshi, to Mazda Motor Manufacturing (USA) Corporation. Method and apparatus for preventing installation in an automobile body of a glass window panel having overcured adhesive thereon. 4,875,955, Cl. 156-64.000.

Fujikoki Manufacturing Co., Ltd.: *See*—
Suzuki, Nobuhiko; and Aoki, Tetuya, 4,875,832, Cl. 417-222.000.

Fujikura Rubber Ltd.: *See*—
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.

Fujikura, Takashi: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,876,261, Cl. 514-307.000.

Fujimoto, Shinji, to Kabushiki Kaisha Daikin Seisakusho. Lock-up damper for torque converter. 4,875,562, Cl. 192-3.280.

Fujimoto, Takanori: *See*—
Hara, Toshiro; Fujimoto, Takanori; and Musa, Ikuo, 4,875,452, Cl. 123-488.000.

Fujioka, Toyohiko; and Takeshima, Hideki, to Mazda Motor Corporation. Vehicle assembly line. 4,875,280, Cl. 29-783.000.

Fujisaki, Tadashi: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.

Fujitsu Limited: *See*—
Eshita, Takashi; Mieno, Fumitake; Furumura, Yuji; and Watanabe, Takuya, 4,876,219, Cl. 437-126.000.
Koshizuka, Atuo, 4,876,467, Cl. 307-570.000.
Shioya, Katsuhiko; Ifuku, Tetsuhiko; and Inamasu, Seiichi, 4,876,645, Cl. 364-200.000.
Suzuki, Eiji, 4,876,683, Cl. 370-97.000.

Fujiwara, Akihiro: *See*—
Amikura, Takashi; Fujiwara, Akihiro; Toyama, Masamichi; Ueda, Kouichi; and Kozuki, Susumu, 4,876,564, Cl. 354-400.000.

Fujiwara, Masanori: *See*—
Hotomi, Hideo; Osawa, Izumi; Iino, Syuji; Doi, Isao; and Fujiwara, Masanori, 4,876,168, Cl. 430-58.000.

Fujiwara, Takayoshi: *See*—
Iida, Toshikatsu; Fujiwara, Takayoshi; and Fukuda, Tetsuo, 4,875,842, Cl. 418-220.000.

Fukada, Isao: *See*—
Nakanishi, Takehisa; Koga, Eizi; and Fukada, Isao, 4,876,372, Cl. 549-529.000.

Fukami, Takeshi: *See*—
Makagami, Tarp; Fukami, Takeshi; and Terauchi, Toshiro, 4,876,719, Cl. 381-1.000.

Fukuda, Naoya: *See*—
Takeya, Fuminori; Fukuda, Naoya; and Suzuki, Miki, 4,875,970, Cl. 156-645.000.

Fukuda, Seiji: *See*—
Sasaki, Katsuhiro; and Fukuda, Seiji, 4,876,686, Cl. 371-49.100.

Fukuda, Tadaji: *See*—
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,876,185, Cl. 430-580.000.

Fukuda, Tetsuo: *See*—
Iida, Toshikatsu; Fujiwara, Takayoshi; and Fukuda, Tetsuo, 4,875,842, Cl. 418-220.000.

Fukunaga, Osamu: *See*—
Mishima, Osamu; Yamaoka, Shinobu; Fukunaga, Osamu; Tanaka, Junzo; and Era, Koh, 4,875,967, Cl. 156-605.000.

Fukushima, Masaya, to NEC Corporation. Laser control circuit. 4,876,442, Cl. 250-205.000.

Fukushima, Motoo: *See*—
Itoh, Kunio; Fukushima, Motoo; and Nakamura, Tsutomu, 4,876,344, Cl. 544-219.000.

Fukutani, Iwao: *See*—
Sakamoto, Yukio; Tanabe, Takeshi; Fukutani, Iwao; and Hori, Toshio, 4,875,862, Cl. 439-79.000.

Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, to Union Carbide Chemicals and Plastics Company Inc. Process for reducing sheeting during polymerization of alpha-olefins. 4,876,320, Cl. 526-62.000.

Fuller, James G.: *See*—
Hughes, Leonard; Fuller, James G.; and Earl, Gary W., 4,876,355, Cl. 548-352.000.

Fulmer, Thomas L. Scented furnace filter. 4,875,912, Cl. 55-279.000.

Funahashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Matsumoto, Makaoto, to Toshiba Silicone Co., Ltd. Epoxy-containing organic silicon compounds. 4,876,363, Cl. 549-215.000.

Funato, Hiroyoshi: *See*—
Misawa, Shigeyoshi; and Funato, Hiroyoshi, 4,876,680, Cl. 369-110.000.

Fuqua, Wayne C.: *See*—
Broussard, Jerry A.; Fuqua, Wayne C.; and George, James H., 4,876,368, Cl. 549-374.000.

Furcht, Leo T.: *See*—
Tsilibary, Effie C.; and Furcht, Leo T., 4,876,332, Cl. 530-326.000.

Furtek, Allan B., to Mobil Oil Corporation. Catalyst composition for polymerizing olefins of narrow molecular weight distribution and polymerization therewith. 4,876,229, Cl. 502-107.000.

Furukawa Aluminum Co., Ltd.: *See*—
Ishii, Yoh; Abe, Masami; Harada, Yuhzoh; Takasugi, Atsumi; and Kato, Kazumi, 4,875,519, Cl. 164-465.000.

Furukawa Electric Co., Ltd.: *See*—
Noda, Hajime; Sato, Kuniyoshi; and Sotani, Junji, 4,875,522, Cl. 165-104.140.

Furumura, Kyozaburo, to Nippon Seiko Kabushiki Kaisha. Method of manufacturing a dynamic pressure type slide bearing. 4,875,263, Cl. 29-149.50S.

Furumura, Yuji: *See*—
Eshita, Takashi; Mieno, Fumitake; Furumura, Yuji; and Watanabe, Takuya, 4,876,219, Cl. 437-126.000.

Furuya, Hirohide: *See*—
Iwasa, Hiroki; Watanabe, Toyofumi; and Furuya, Hirohide, 4,875,984, Cl. 204-56.100.

Fuse, Genzo; Miwa, Hiroshi; and Kawasaki, Yoshinobu, to Honda Giken Kogyo Kabushiki Kaisha. Robot apparatus. 4,875,823, Cl. 414-735.000.

Futamura, Shoji: *See*—
Inoue, Satoru; and Futamura, Shoji, 4,875,264, Cl. 29-163.600.

Futonair Quebec, Inc.: *See*—
Tremblay, Gilles, 4,875,244, Cl. 5-37.00R.

Futsuki, Atsunori: *See*—
Anzai, Hiroshi; and Futsuki, Atsunori, 4,875,484, Cl. 128-421.000.

G. D. Searle & Co.: *See*—
Koszyk, Francis J.; Partis, Richard A.; and Mueller, Richard A., 4,876,268, Cl. 514-425.000.

G.D. Societa per Azioni: *See*—
Gamberini, Antonio; and Brizzi, Marco, 4,875,325, Cl. 53-137.000.
Mattei, Riccardo; and Ghini, Franco, 4,875,493, Cl. 131-84.100.

G & H Montage: *See*—
Schwartz, Karl-Gunter, 4,875,312, Cl. 52-144.000.

Gacsay, Lorant; and Meierhofer, Beat, to Sulzer Brothers Limited. Yarn brake for a weft yarn. 4,875,506, Cl. 139-450.000.

Gagnon, Pierre; and Laforest, Pierre. Push actuator. 4,875,660, Cl. 254-1.000.

Gairns, Raymond S.: *See*—
Elliott, Raymond; Griffin, David A.; and Gairns, Raymond S., 4,875,922, Cl. 71-76.000.

Gala, Dinesh: *See*—
Hou, Donald; Wong, Yee-Shing; Gala, Dinesh; and Steinman, Martin, 4,876,338, Cl. 540-357.000.

Galiotti, George: *See*—
Rao, Ram A.; Kofod, Mogens; Puchammer, Julius; and Galiotti, George, 4,875,754, Cl. 350-96.200.

Gallione, Joseph: *See*—
Oury, Robert F.; and Gallione, Joseph, 4,875,569, Cl. 198-36.00D.

Gamberini, Antonio; and Brizzi, Marco, to G.D. Societa per Azioni. Device for transferring and applying sealing bands. 4,875,325, Cl. 53-137.000.

Gant, Preston L.: *See*—
Casad, Burton M.; and Gant, Preston L., 4,876,449, Cl. 250-259.000.

Garcia, Georges: *See*—
Barbier, Alain; Breliere, Jean-Claude; and Garcia, Georges, 4,876,247, Cl. 514-89.000.
Breliere, Jean C.; Emonds-Alt, Xavier; and Garcia, Georges, 4,876,248, Cl. 514-108.000.

Garcia, Mario C., to Prevent Products, Inc. Ankle support bandage for prevention of ankle injury. 4,875,476, Cl. 128-157.000.

Gardin, Gilles D.: *See*—
Movilliat, Pierre A.; Piegay, Yves; and Gardin, Gilles D., 4,875,679, Cl. 273-73.00R.

Gardner, Bronson; Keener, Melvin E.; DeSutter, Steven C.; Jagatich, Carl T.; and Felice, Ralph A., to Standard Oil Company, The. Apparatus for determining water stress in crops. 4,876,647, Cl. 364-420.000.

Gardner, David L.: *See*—
Benton, Ben F.; and Gardner, David L., 4,876,094, Cl. 424-491.000.

Gardner, David M.; Wheaton, Gregory A.; and Nosowitz, Martin, to Pennwalt Corporation. Purification of alkanesulfonyl chlorides. 4,876,048, Cl. 260-543.00R.
Gardner, E. Boyd, to Emhart Industries, Inc. Apparatus and method for controlling the shear mechanism of a glassware forming machine. 4,876,652, Cl. 364-473.000.
Garnatz, Anthony H.; and Ronne, William M., to Garon Corp. Disposable oil absorbent drip pad assembly for a vehicle. 4,875,537, Cl. 180-69.100.
Garon Corp.: *See—*
Garnatz, Anthony H.; and Ronne, William M., 4,875,537, Cl. 180-69.100.
Garris, Charles A., to Memrysafe, Inc. Valve control. 4,875,623, Cl. 236-12.120.
Garwood, William E.: *See—*
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.
Gas Research Institute: *See—*
DeSaro, Robert; Doyle, Edward F.; Metcalfe, Christopher I.; and Patch, Keith D., 4,875,919, Cl. 65-27.000.
Gasiunas, Donatas V.; Sette, Paul R.; and Storace, Anthony, to Pitney Bowes Inc. Postage meter printwheel setting apparatus. 4,875,788, Cl. 400-163.100.
Gathings, Thomas. Apparatus for feeding bar stock to a machining operation. 4,875,396, Cl. 82-124.000.
Gaughan, Edward W.: *See—*
Hart, James E.; and Gaughan, Edward W., 4,875,739, Cl. 303-33.000.
Gay, Michael J., to Motorola Inc. Sampled data circuit. 4,876,464, Cl. 307-353.000.
Gaz de France: *See—*
Cagnon, Francois; Di Paola, Denis; Austruy, Georges; and Vinchon, Andre , 4,875,850, Cl. 431-8.000.
Geary, Philip J.: *See—*
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,876,200, Cl. 435-253.300.
Gedecke, Jerel C.: *See—*
Brint, Gary T.; Bungardt, Gabriele; Gedecke, Jerel C.; Harris, Robert L.; and Kraz, Vladimir, 4,876,712, Cl. 379-387.000.
Gelardi, Anthony; Lowry, Alan; and Lovecky, Craig, to Shape Inc. Recording media storage apparatus. 4,875,743, Cl. 312-13.000.
Geller, Marius, to BBC Brown Boveri AG. Gas-cooled electric machine. 4,876,470, Cl. 310-59.000.
Gellert, Jobst U. Injection molding heated gate insert and method. 4,875,848, Cl. 425-549.000.
GenCorp Inc.: *See—*
Melby, Earl G.; and Cocain, H. William, 4,876,308, Cl. 524-780.000.
General Dynamics Corp., Pomona Div.: *See—*
Perko, Louis S., 4,875,966, Cl. 156-580.000.
General Electric CGR S.A.: *See—*
Delair, Jacques; and Peyret, Olivier, 4,876,705, Cl. 378-144.000.
General Electric Company: *See—*
Bedard, Donna L.; and Brennan, Michael J., Jr., 4,876,201, Cl. 435-262.000.
Belke, Robert E.; Zakraysek, Louis; and Pillar, Walter O., 4,876,120, Cl. 428-1.000.
Bender, Stanley I.; Butler, Lawrence; and Dawes, Peter W., 4,875,655, Cl. 248-557.000.
Blackmon, Kenneth P.; Clagett, Donald C.; Fox, Daniel W.; Maresca, Louis M.; and Shafer, Sheldon J., 4,876,317, Cl. 525-433.000.
Dougherty, John J., 4,876,622, Cl. 361-94.000.
Herschitz, Roman; Bogorad, Alexander; and Harhigh, Robert N., 4,876,430, Cl. 219-110.000.
Johansson, Eric B., 4,876,063, Cl. 376-444.000.
Kissinger, Gaylord M., 4,876,391, Cl. 568-724.000.
Kissinger, Gaylord M., 4,876,395, Cl. 568-728.000.
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.
Miller, Richard; and Zlupko, John E., 4,876,421, Cl. 200-144.00C.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,876,309, Cl. 524-109.000.
Park, John N.; Steigerwald, Robert L.; and Schutten, Michael J., 4,876,635, Cl. 363-17.000.
Rasmussen, Neil S.; Szema, Li-Chieh; and Abuaf, Nesim, 4,875,339, Cl. 60-757.000.
Taylor, Dale F., 4,876,064, Cl. 420-422.000.
Vermilyea, Mark E., 4,876,413, Cl. 174-15.400.
General Electric Company, p.l.c., The: *See—*
Dekker, Nicolaas M. J.; Edwards, John W.; and James, Adrian W., 4,876,722, Cl. 381-71.000.
General Foods Corporation: *See—*
McGuire, Michael; DiGiacomo, Ralph; Palmer, Marcia; and Liggett, Louis, 4,876,104, Cl. 426-57.000.
General Motors Corporation: *See—*
Compeau, David E.; Manuel, Mark; and Rogers, Lloyd W., Jr., 4,875,723, Cl. 292-201.000.
General Signal Corporation: *See—*
Jacobs, Paul H.; and Collette, Douglas P., 4,876,741, Cl. 455-47.000.
Gentile, Geoffrey E., to Boeing Company, The. Raster rotation circuit. 4,876,488, Cl. 315-378.000.
Gentile, John R., to Laser Precision Corporation. Remotely controlled optical time domain reflectometer serving a plurality of fiber optic cables. 4,875,772, Cl. 356-73.100.
Gentry, Dennis L.: *See—*
Head, James D.; Burns, Edward F.; Schleizer, William A.; White, C. Douglas; and Gentry, Dennis L., 4,875,662, Cl. 266-44.000.
Georg Fischer AG: *See—*
Hanselka, Reinhard, 4,876,041, Cl. 264-25.000.
George, James H.: *See—*
Broussard, Jerry A.; Fuqua, Wayne C.; and George, James H., 4,876,368, Cl. 549-374.000.
Gerhards, Hermann J.: *See—*
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.
Germundson, Elon: *See—*
Lindberg, Kaj; Steen, Gerry; and Germundson, Elon, 4,875,806, Cl. 405-224.000.
Gerrard, Donald L.: *See—*
Bowley, Heather J.; and Gerrard, Donald L., 4,875,771, Cl. 356-30.000.
Gervasutti, Claudio, to Ausimont S.p.A. Process for preparing fluoroethylenes and chlorofluoro-ethylenes from chlorofluoroethanes. 4,876,405, Cl. 570-156.000.
Ghahremani-Ghadjar, Fathali: *See—*
Hariri, Robert J.; Ghajar, Jamshid B. G.; and Ghahremani-Ghadjar, Fathali, 4,875,482, Cl. 128-352.000.
Ghajar, Jamshid B. G.: *See—*
Hariri, Robert J.; Ghajar, Jamshid B. G.; and Ghahremani-Ghadjar, Fathali, 4,875,482, Cl. 128-352.000.
Ghini, Franco: *See—*
Mattei, Riccardo; and Ghini, Franco, 4,875,493, Cl. 131-84.100.
Giacosa, Dante, to Fiat Auto S.p.A. Continuous speed variator with expanding pulleys. 4,875,893, Cl. 474-28.000.
Giallorenzi, Thomas G., to United States of America, Navy. Optical paramagnetic/diamagnetic gas sensor. 4,875,357, Cl. 73-27.00A.
Gibson, D. Glenn: *See—*
Andrews, T. Arthur; and Gibson, D. Glenn, 4,875,498, Cl. 137-78.300.
Gibson, Glenn A. Rules and apparatus for a loop capturing code buffer that prefetches instructions. 4,876,642, Cl. 364-200.000.
Gibson, Paul N., to McFarlane, Ronald L. Control system for earth boring tool. 4,875,292, Cl. 33-304.000.
Gietzen, Staas; Weiner, Hans; Hain, Klaus; Hofbauer, August; and Hawener, Juergen, to Dr. Ing. h.c.F. Porsche AG. Starter arrangement for a helicopter. 4,875,643, Cl. 244-53.00A.
Gijsman, Pieter: *See—*
Peerlkamp, Erik R.; and Gijsman, Pieter, 4,876,301, Cl. 524-255.000.
Gilbert, Dennis H., to Boeing Company, The. Echo cancellation system. 4,875,372, Cl. 73-614.000.
Gilberts, Alexander G.: *See—*
Rust, Wayne; and Gilberts, Alexander G., 4,876,621, Cl. 361-58.000.
Gillette Company, The: *See—*
Trotta, Robert A.; and Cerier, Jeffrey C., 4,875,288, Cl. 30-49.000.
Gilman, Byron L.: *See—*
Mayer, David W.; Gilman, Byron L.; Walgren, Susan M.; and Berglund, June M., 4,876,109, Cl. 427-2.000.
Gingello, Anthony D.: *See—*
Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, 4,876,181, Cl. 430-522.000.
Girard, Henri: *See—*
Bernard, Patrice; Sauvage, Laurent; Girard, Henri; and Ferrero, Jean-Pierre, 4,876,057, Cl. 376-216.000.
Girard, Mario D. Device for locking double sliding doors. 4,875,349, Cl. 70-95.000.
Girard, Yves: *See—*
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, 4,876,246, Cl. 514-80.000.
Giroux, Richard L.: *See—*
Bradley, Billie J.; Giroux, Richard L.; and Joyce, Allen T., 4,875,524, Cl. 166-241.000.
Glanzner, Gary C.: *See—*
Wright, Norman D.; Glanzner, Gary C.; and Signorelli, John A., 4,875,412, Cl. 101-425.000.
Glaser, Fritz: *See—*
Hagerer, Paul; Glaser, Fritz; Klimmer, Josef W.; and Kunze, Reinhard, 4,875,889, Cl. 460-1.000.
Glaxo Group Limited: *See—*
Butina, Darko; Dowle, Michael D.; Bays, David E.; and Webb, Colin F., 4,876,267, Cl. 514-415.000.
Robinson, Colin; Eastlick, David T.; and Bownass, Audrey J., 4,876,351, Cl. 548-204.000.
Globe-Union Inc.: *See—*
Brilmyer, George H.; and Tiedemann, William H., 4,876,513, Cl. 324-427.000.
Glushkov, Robert G.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.
Glynn, William: *See—*
Denny, David S.; Metzger, Edward C. R.; Rexroad, John; and Glynn, William, 4,875,549, Cl. 182-138.000.

Glyzinc Pharmaceuticals Limited: *See—*
Taylor, Reginald M.; and Brock, Alan J., 4,876,278, Cl. 514-494.000.
Godbersen, Byron L. Boat trailer hull and keel supporting assembly. 4,875,701, Cl. 280-414.100.
Godfrey, Christopher R. A.: *See—*
Anthony, Vivienne M.; Clough, John M.; DeFraine, Paul; and Godfrey, Christopher R. A., 4,876,264, Cl. 514-345.000.
Goedecke, Hans J. Gas- and liquid-tight fastener. 4,875,258, Cl. 24-389.000.
Goffinet, Pierre: *See—*
D'Hoogue, Martial; Perrette, Claude; and Goffinet, Pierre, 4,875,600, Cl. 222-52.000.
Goldner, Ronald B.; Haas, Terry; Wong, Kwok-Keung; and Seward, George, to Tufts University. Thin film ion conducting coating. 4,876,628, Cl. 361-313.000.
Gongora, Henri; and Darche, Yves, to Societe Nationale Elf Aquitaine (Production). Process for the production of organic polysulphides and catalyst system for its use. 4,876,389, Cl. 568-26.000.
Goodell, Jeffrey W. Curtain supporting bracket. 4,875,650, Cl. 248-261.000.
Goodwin, Paul, to Perma Tubes Ltd. Concrete forming method. 4,876,054, Cl. 264-333.000.
Goodyear Tire & Rubber Company, The: *See—*
Rinehart, Verne R., 4,876,326, Cl. 528-272.000.
Gordon, Lucas S.: *See—*
Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., 4,876,066, Cl. 422-46.000.
Gorge Technology, Inc.: *See—*
Baldwin, Donald C., 4,875,424, Cl. 114-39.200.
Goris, Gregory A.: *See—*
Wetch, Stephen B.; Goris, Gregory A.; and Krasnov, Igor, 4,875,529, Cl. 173-163.000.
Gosc, Paul M.: *See—*
Citta, Richard W.; Gosc, Paul M.; Mutzabaugh, Dennis M.; and Sgrignoli, Gary J., 4,876,718, Cl. 380-42.000.
Goshima, Takahiro: *See—*
Ozawa, Takashi; Tanaka, Hitoshi; Goshima, Takahiro; and Takagi, Kozi, 4,875,741, Cl. 303-116.000.
Gosselink, Eugene P.: *See—*
Clauss, Allen D.; and Gosselink, Eugene P., 4,876,046, Cl. 8-111.000.
Gotaverken Arendal AB: *See—*
Lindberg, Kaj; Steen, Gerry; and Germundson, Elon, 4,875,806, Cl. 405-224.000.
Gotou, Shizuo; Kagimasa, Toyohiko; and Yoshizumi, Seiichi, to Hitachi, Ltd. Data processor having multilevel address translation tables. 4,876,646, Cl. 364-200.000.
Gottlieb, A. Arthur, to Imreg, Inc. (Delaware corporation). Determination of suppressor functional reserve. 4,876,193, Cl. 435-29.000.
Governor of Gunma-ken: *See—*
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.
Grabenstein, James B.: *See—*
Woodworth, Donald J.; Ziegler, Frank A.; and Grabenstein, James B., 4,876,737, Cl. 455-12.000.
Graber, John W., to Graber Products, Inc. Vehicle mounted foldable bicycle carrier. 4,875,608, Cl. 224-42.03B.
Graber Products, Inc.: *See—*
Graber, John W., 4,875,608, Cl. 224-42.03B.
Gradich, Francis X.: *See—*
Brown, Stephen D.; Junker, Warren R.; and Gradich, Francis X., 4,876,506, Cl. 324-220.000.
Graham, Kenneth W.: *See—*
Norton, Edward J.; Fram, Craig F.; Graham, Kenneth W.; and Smith, James A., 4,876,053, Cl. 264-255.000.
Graham, Robert G.: *See—*
Underwood, Gary; and Graham, Robert G., 4,876,108, Cl. 426-650.000.
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A. 1-thiocarbamylmethylpyrrolidine-2-thione, process for preparing. 4,876,360, Cl. 548-550.000.
Grant, David W.: *See—*
Browder, George A. G., Jr.; and Grant, David W., 4,875,241, Cl. 2-409.000.
Gratke, Norman G., to W. H. Brady Co. Self-referencing capacitive key cell structure and switchcore matrices formed therefrom. 4,876,461, Cl. 307-116.000.
Graves, Alan F.; Littlewood, Paul A.; and Weiss, Johannes S., to Northern Telecom Limited. Switching tdm digital signals. 4,876,682, Cl. 370-66.000.
Green Cross Corporation: *See—*
Hirao, Yutaka; Takechi, Kazuo; Uriyu, Katuhiro; and Uemura, Yahiro, 4,876,088, Cl. 424-85.800.
Green, Monika J.; and Lias, Roger J., to Medisense, Inc. Electrochemical assay for haemoglobin. 4,876,205, Cl. 436-66.000.
Greig, Walter G.: *See—*
Ashby, Robert E.; and Greig, Walter G., 4,876,131, Cl. 428-42.000.
Gresch, Heinrich: *See—*
Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Burggraf, Peter, 4,875,406, Cl. 98-2.010.
Greveling, Johannes, to Northern Telecom Limited. Optical cable. 4,875,757, Cl. 350-96.230.
Grice, Neal J.: *See—*
Knifton, John F.; and Grice, Neal J., 4,876,397, Cl. 568-798.000.
Griffin, David A.: *See—*
Elliott, Raymond; Griffin, David A.; and Gairns, Raymond S., 4,875,922, Cl. 71-76.000.
Griffiths, Colin; and Walker, William G., to Ebonwood Limited. Method and apparatus for manufacturing carpet. 4,875,954, Cl. 156-64.000.
Grindahl, Mervin L., to E. F. Johnson Company. Data demodulator. 4,876,700, Cl. 375-87.000.
Grollier, Jean F.; and Cotteret, Jean, to L'Oreal. Alkyl derivatives of hydroquinone as antioxidants in oxidation dyeing compositions. 4,875,902, Cl. 8-406.000.
Grollier, Jean F.; and Dupuis, Christine, to L'oreal. Composition in the form of an aerosol foam, based on a polymer derived from quaternized cellulose and an anionic polymer. 4,876,083, Cl. 424-47.000.
Grollier, Jean F.; and Fourcadier, Chantal, to L'Oreal. Cosmetic composition containing oxathiazinones. 4,876,085, Cl. 424-47.000.
Gronsfeld, Josef; Jacobi, Hatto; and Baethmann, Hans-Juergen, to Mannesmann AG. Determining impurities in samples. 4,875,371, Cl. 73-598.000.
Groot, William P.: *See—*
Petersen, Borge; and Groot, William P., 4,875,670, Cl. 271-265.000.
Gross, Anthony E.; and Bonin, Jacqueline L., to Nalco Chemical Company. Anionic acrylamide polymers as copper ore agglomeration aids. 4,875,935, Cl. 75-117.000.
Gross, Douglas P. Miniature golf game apparatus. 4,875,680, Cl. 273-87.00B.
Gross, Rainer: *See—*
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Gross, Robert. Toxic waste storage facility. 4,875,805, Cl. 405-128.000.
Gross, Sylvia. Emergency warning brake system. 4,876,525, Cl. 340-436.000.
Grosskopf, Rudolf: *See—*
Ballmer, Horst; and Grosskopf, Rudolf, 4,876,535, Cl. 340-825.340.
Gruber, Bruce A.: *See—*
Shriver, H. Randall; Dunnavant, William R.; and Gruber, Bruce A., 4,876,294, Cl. 523-139.000.
Gruber, Herbert, to Magna International Inc. Hood latch mechanism. 4,875,724, Cl. 292-216.000.
Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., to Xerox Corporation. Toner compositions with release additives therein. 4,876,169, Cl. 430-110.000.
Grumman Aerospace Corporation: *See—*
Anderson, Robert E., 4,875,795, Cl. 403-279.000.
Grussmark, Stephen M. Orthodontic appliance for closing spaces and correcting malocclusion. 4,875,856, Cl. 433-18.000.
Gschwender, Alois; Kruger, Horst; and Schleifer, Bernhard, to Flux Gerate GmbH. Fluid pump and method for making the same. 4,875,827, Cl. 415-111.000.
GTE Products Corporation: *See—*
Cox, David A., 4,876,483, Cl. 313-634.000.
Crosby, John J.; and Napiorkowski, John J., 4,876,713, Cl. 379-412.000.
Ide, Mason G.; Lawrence, Noel L. W.; and Prager, Lee, 4,876,436, Cl. 219-370.000.
GTE Sylvania Licht GmbH: *See—*
Beucher, Josef, 4,876,443, Cl. 250-211.00R.
Guarnori, Manuel, to Roland Racine. Assembly comprising rolling means and slideways, and lighting apparatus comprising such an assembly. 4,875,648, Cl. 248-125.000.
Guigan, Jean. Method of performing medical analysis on a liquid sample using at least one dry reagent, and apparatus for the method. 4,876,203, Cl. 436-45.000.
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, to Merck Frosst Canada, Inc. Benzo[a]phenothiazines and hydro-derivatives for inhibiting leukotriene biosynthesis. 4,876,246, Cl. 514-80.000.
Guion, Christian: *See—*
Berthon, Patrick; and Guion, Christian, 4,876,540, Cl. 340-932.200.
Guiver, Harold C.: *See—*
Wagner, Edward A.; and Guiver, Harold C., 4,876,225, Cl. 437-248.000.
Gunawardena, D. R.: *See—*
Tullis, Barclay J.; Bailey, John S.; Gunawardena, D. R.; and Kaempf, Ulrich, 4,875,825, Cl. 414-786.000.
Gunkinger, Siegfried, to Zinser Textilmaschinen GmbH. Method and apparatus for replacing empty sliver cans with full sliver cans in a draw frame. 4,875,256, Cl. 19-159.00A.
Guntheroth, Kurt, to John Fluke Mfg. Co., Inc. Method of and apparatus for diagnosing failures in read only memory systems and the like. 4,876,684, Cl. 371-21.200.
Gunze Kabushiki Kaisha: *See—*
Yamamoto, Takeshi; Kondo, Kunio; Yoshimura, Hiroshi; Wada, Yoshihiro; and Wada, Fusazo, 4,876,139, Cl. 428-200.000.
Gupta, Ashis S.: *See—*
Burke, Robert W., II; Cahen, Albert J., Jr.; Credle, William S., Jr.; Gupta, Ashis S.; and Heenan, Richard H., 4,875,508, Cl. 141-2.000.
Gustafson, Eric K.; Trebino, Rick; and Lee, John, to Yellowstone Diagnostics Corporation. Diffraction immunoassay apparatus and method. 4,876,208, Cl. 436-531.000.

Gustafsson, Bengt O.; and Johansson, Nils B., to SKF Plasma Technologies AB. Method for separating zinc out of a hot gas containing zinc vapour. 4,876,074, Cl. 423-210.500.

Gusten, Hans; Ache, Hans-Joachim; Rinke, Monika; and Wirth, Hermann O., to Kernforschungszentrum Karlsruhe Gesellschaft mit Beschrankter Haftung. Substituted and unsubstituted ring-bridged para-oligophenylene UV laser dyes. 4,876,029, Cl. 252-301.170.

Gutberlet, Louis C.: *See*—
Kukes, Simon G.; Miller, Jeffrey T.; and Gutberlet, Louis C., 4,875,991, Cl. 208-59.000.

Guyomard, Daniel; Torrez, Gerald; Lambour, Jean-Michel; and Arriveau, Claude, to B.A.S.F. Peintures & Encres S.A. Method for depositing a primer or sealer of programmed color on an object. 4,876,111, Cl. 427-31.000.

Haan, Franz; and Hock, Lothar, to Siemens Aktiengesellschaft. Apparatus and method for equipping printed circuit boards with components. 4,875,285, Cl. 29-832.000.

Haas, Terry: *See*—
Goldner, Ronald B.; Haas, Terry; Wong, Kwok-Keung; and Seward, George, 4,876,628, Cl. 361-313.000.

Habitation: *See*—
Isola, Richard A., 4,875,245, Cl. 5-482.000.

Hacksell, Uli A.: *See*—
Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., 4,876,284, Cl. 514-657.000.

Hadaway, Bernard M.: *See*—
Wingate-Hill, Robin; and Hadaway, Bernard M., 4,875,511, Cl. 144-208.00R.

Haddad, James H.; Owen, Hartley; and Schatz, Klaus W. Process and apparatus for catalytic cracking of residual oils. 4,875,994, Cl. 208-113.000.

Hadley, Howard C., to Deere & Company. Seeding implement with a combination transport-drive wheel. 4,875,421, Cl. 111-200.000.

Hadley, Stephen W.: *See*—
Wilbut, Daniel S.; and Hadley, Stephen W., 4,876,081, Cl. 424-1.100.

Hafele, Carl H.; and Weyand, Manfred, to Sempell Aktiengesellschaft; and Hafele, Carl Heinz. Servo-valve. 4,875,659, Cl. 251-282.000.

Hafele, Carl Heinz: *See*—
Hafele, Carl H.; and Weyand, Manfred, 4,875,659, Cl. 251-282.000.

Hagerer, Paul; Glaser, Fritz; Klimmer, Josef W.; and Kunze, Reinhard, to Deere & Company. Combine crop material flow adjustment system. 4,875,889, Cl. 460-1.000.

Hagin, Faust; Drewitz, Hans; and Krenner, Manfred, to MAN Nutzfahrzeuge GmbH. Brake play resetting device. 4,875,557, Cl. 188-79.550.

Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, to Hitachi, Ltd. Packet switching equipment and a packet switching method for controlling packet switched networks. 4,876,681, Cl. 370-60.000.

Hahn, Guenter: *See*—
Niederhuefner, Detlev; Hahn, Guenter; and Baczyzmalski, Andrzej, 4,876,417, Cl. 200-48.00V.

Haight, William J., to Mineral Recovery Corporation. Apparatus and method of classifying particles. 4,875,999, Cl. 209-245.000.

Hain, Klaus: *See*—
Gietzen, Staas; Weiner, Hans; Hain, Klaus; Hofbauer, August; and Hawener, Juergen, 4,875,643, Cl. 244-53.00A.

Hain, Leonard P. Clamp for holding work pieces in the formation of trusses. 4,875,666, Cl. 269-37.000.

Haining, Alvin S.: *See*—
Albrecht, Leonard N.; and Burke, Steven R., 4,875,242, Cl. 4-243.000.

Haining, Katherine R.: *See*—
Albrecht, Leonard N.; and Burke, Steven R., 4,875,242, Cl. 4-243.000.

Hajos, Zoltan G.; Kanojia, Ramesh M.; and Press, Jeffery B., to Ortho Pharmaceutical Corporation. 6-Substituted purinyl piperazine derivatives useful as cardiotonic and antiarrhythmic agents. 4,876,257, Cl. 514-253.000.

Hakamori, Sen-Itiroh, to Fred Hutchinson Cancer Research Center. Hybridomas producing monoclonal antibodies to mono-, di-, and trifucosylated type 2 chain. 4,876,199, Cl. 530-387.000.

Haley, William J.: *See*—
Schneider, Karl F.; Haley, William J.; and Miller, Alan L., 4,875,561, Cl. 192-0.033.

Hall, Richard A., Sr. Hopper transport for injection molding. 4,876,043, Cl. 264-39.000.

Halliburton Company: *See*—
Bradley, Billie J.; Giroux, Richard L.; and Joyce, Allen T., 4,875,524, Cl. 166-241.000.

Hamaguchi, Tatsuya: *See*—
Shimodaira, Hisayo; Ono, Toshio; Miyawaki, Keizo; and Hamaguchi, Tatsuya, 4,875,766, Cl. 350-641.000.

Hamakawa, Yoshihiro; Tawada, Yoshihisa; Tsuge, Kazunori; and Izumina, Masanobu, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Flexible photovoltaic device. 4,875,943, Cl. 136-244.000.

Hamdy, Esmat Z.: *See*—
Mohsen, Amr M.; Hamdy, Esmat Z.; and McCollum, John L., 4,876,220, Cl. 437-170.000.

Hamill, Robert L.; and Yao, Raymond C., to Eli Lilly and Company. Antibotic A80577 and process for its production. 4,876,273, Cl. 514-451.000.

Hamner, Glen P., to Exxon Research and Engineering Company. Process for the production of high density jet fuel from fused multiring aromatics and hydroaromatics. 4,875,992, Cl. 208-89.000.

Hamrick, Jerry O. Mechanics creeper apparatus. 4,875,694, Cl. 280-32.600.

Han, Ink S.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Han, Scott: *See*—
Bowes, Emmerson; Chang, Clarence D.; Han, Scott; and Shihabi, David S., 4,876,411, Cl. 585-533.000.

Hanazawa, Kazuyoshi: *See*—
Mizuno, Shinji; Kawato, Humio; Hanazawa, Kazuyoshi; Aoyama, Tatsuaki; and Ogasawara, Yoshinari, 4,875,911, Cl. 55-162.000.

Handy Button Machine Company: *See*—
Anderson, Robert E.; and Baritz, Michael L., 4,875,257, Cl. 24-90.00B.

Hanrahan, Michael J.: *See*—
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.

Hanselka, Reinhard, to Georg Fischer AG. Method for fusion joining plastic pipe. 4,876,041, Cl. 264-25.000.

Hansen, Arthur J. Thumb controlled fishing line, casting device. 4,875,304, Cl. 43-25.000.

Hanson, Raymond; Tillyard, Malcolm; and Allen, Christopher M., to British United Shoe Machinery Limited. Curing coatings of a moisture-curable composition. 4,876,434, Cl. 219-215.000.

Hanssler, Gerd: *See*—
Fuhrer, Wolfgand; Kuhle, Engelbert; Adler, Alfons; and Hanssler, Gerd, 4,876,253, Cl. 514-241.000.

Hanthorn, Philip T. Portable conveyor system with telescopic boom assembly and load carrying apparatus. 4,875,547, Cl. 182-102.000.

Haque, Sazzadul; Floyd, Thomas O.; Savas, Nick; and Kelm, Walter H., to Carboloy Inc. Cutting tool employing a double pin retention assembly. 4,875,812, Cl. 407-104.000.

Hara, Hitoshi; and Sumen, Hiroyoshi, to Sumitomo Heavy Industries, Ltd. Injection nozzle for an injection molding machine. 4,875,845, Cl. 425-143.000.

Hara, Junichiro; Ogihara, Yoshiyuki; and Takahashi, Hideo, to Nissan Motor Company, Limited. Air conditioner system for automotive vehicle. 4,875,624, Cl. 236-49.500.

Hara, Kazuya; Inoue, Takanori; and Bito, Hiroyasu, to Casio Computer Co., Ltd. Card-like electronic apparatus. 4,876,441, Cl. 235-488.000.

Hara, Kazuyoshi; and Oda, Masataka, to Minolta Camera Kabushiki Kaisha. Paper separation charger for use in electrophotographic copier and the like. 4,876,578, Cl. 355-315.000.

Hara, Tadayuki: *See*—
Morishita, Mitsuharu; Kohge, Shinichi; Hara, Tadayuki; Hata, Yasuaki; and Umemaru, Hisato, 4,875,367, Cl. 73-118.100.

Hara, Toshihiro: *See*—
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.

Hara, Toshiro; Fujimoto, Takanori; and Musa, Ikuo, to Mitsubishi Denki Kabushiki Kaisha. Fuel control apparatus for an internal combustion engine. 4,875,452, Cl. 123-488.000.

Harada, Tadanori: *See*—
Hashimoto, Seiji; and Harada, Tadanori, 4,876,601, Cl. 358-213.260.

Harada, Yoshihara: *See*—
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.

Harada, Yuhzoh: *See*—
Ishii, Yoh; Abe, Masami; Harada, Yuhzoh; Takasugi, Atsumi; and Kato, Kazumi, 4,875,519, Cl. 164-465.000.

Harbor Branch Oceanographic Institution, Inc.: *See*—
Tusting, Robert F., 4,876,565, Cl. 354-403.000.

Harbor Industries: *See*—
Martin, Gregory G.; and Nook, Thomas J., 4,875,590, Cl. 211-55.000.

Harding, Kevin G., to Industrial Technology Institute. Off-axis high accuracy structured light profiler. 4,875,777, Cl. 356-376.000.

Hardt, Walter: *See*—
Moeckl, Ernst; Stumpf, Jorg; Hardt, Walter; and Doinghaus, Hermann, 4,875,418, Cl. 108-50.000.

Hardy, Judy; and Wallington, Kenneth, to Raychem Limited. Article for protecting a substrate. 4,875,870, Cl. 439-204.000.

Harhigh, Robert N.: *See*—
Herschitz, Roman; Bogorad, Alexander; and Harhigh, Robert N., 4,876,430, Cl. 219-110.000.

Hariri, Robert J.; Ghajar, Jamshid B. G.; and Ghahremani-Ghadjar, Fathali, to Neurodynamics, Inc. Flexible grasping device. 4,875,482, Cl. 128-352.000.

Harms, Harold B.: *See*—
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.

Harris Corporation: *See*—
Davis, Christopher K.; and Beasom, James D., 4,876,579, Cl. 357-22.000.

Harris, Rano J., Jr., to Romar Technologies, Inc. Boat fenders with internal rope storage capacity. 4,875,427, Cl. 114-219.000.

Harris, Robert L.: *See*—
Brint, Gary T.; Bungardt, Gabriele; Gedecke, Jerel C.; Harris, Robert L.; and Kraz, Vladimir, 4,876,712, Cl. 379-387.000.

Harrison, George M. Traffic lane marking device. 4,875,799, Cl. 404-12.000.

Hart, James E.; and Gaughan, Edward W., to American Standard Inc. Independent continual quick service valve device. 4,875,739, Cl. 303-33.000.

Hart, Michael G.: *See—*
Wong, Roger W.; Vifian, Hugo; and Hart, Michael G., 4,875,859, Cl. 434-214.000.

Hartman, George D.; and Prugh, John D., to Merck & Co., Inc. Substituted thieno[3,2-b]thiophene-2-sulfonamides as topically active carbonic anhydrase inhibitors. 4,876,271, Cl. 514-443.000.

Hartter, Timothy R.: *See—*
Wenger, LaVon G.; Hauck, Bobbie W.; and Hartter, Timothy R., 4,875,847, Cl. 425-204.000.

Hartwig, Klaus, to Kaymar-Parkguard Inc. Parking space guard. 4,875,797, Cl. 404-9.000.

Harvey, Donald M., to Eastman Kodak Company. Film cassette. 4,875,638, Cl. 242-71.100.

Harvey, Thomas J. Eye construction for toy doll. 4,875,888, Cl. 446-392.000.

Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, to Hitachi, Ltd. Wire stacked bonding method. 4,875,618, Cl. 228-179.000.

Hasegawa, Hiroshi; Shioiri, Noriaki; Narita, Tadashi; and Katori, Tatsuhiko, to SS Pharmaceutical Co., Ltd. Novel gamma-butyrolactone derivatives. 4,876,359, Cl. 548-533.000.

Hashimoto Corporation: *See—*
Hashimoto, Kazuo, 4,876,707, Cl. 379-57.000.

Hashimoto, Kazuo, to Hashimoto Corporation. Two-directional call forwarding device. 4,876,707, Cl. 379-57.000.

Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, to Mazda Motor Corporation. Automobile exhaust gas recirculating system. 4,875,455, Cl. 123-568.000.

Hashimoto, Seiji; and Harada, Tadanori, to Canon Kabushiki Kaisha. Imaging apparatus having zoom capability via readout variation. 4,876,601, Cl. 358-213.260.

Hashino, Hiroshi: *See—*
Tomosada, Kenji; Kondo, Toshiro; Yamamoto, Tadanobu; and Hashino, Hiroshi, 4,875,704, Cl. 280-695.000.

Hass, Hyman, to United States Tennis Association Incorporated; and Allard Avionics Corp. Method and apparatus for systematically testing objects including tennis balls. 4,876,658, Cl. 364-550.000.

Hassan, Shawky A. Liquid dispensing brush. 4,875,791, Cl. 401-176.000.

Hata, Yasuaki: *See—*
Morishita, Mitsuharu; Kohge, Shinichi; Hara, Tadayuki; Hata, Yasuaki; and Umemaru, Hisato, 4,875,367, Cl. 73-118.100.

Hatada, Kenzo, to Matsushita Electric Industrial Co., Ltd. Bonding method. 4,876,221, Cl. 437-212.000.

Hattori, Akinobu: *See—*
Usami, Jun; Hattori, Akinobu; and Sasaki, Yuichi, 4,875,981, Cl. 204-1.00T.

Hattori, Hitoshi: *See—*
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.

Hattori, Junichi: *See—*
Aoyama, Takeo; Imai, Teruo; Hattori, Junichi; and Uehara, Mikio, 4,876,049, Cl. 264-49.000.

Hattori, Yumi: *See—*
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,876,263, Cl. 514-338.000.

Hauck, Bobbie W.: *See—*
Wenger, LaVon G.; Hauck, Bobbie W.; and Hartter, Timothy R., 4,875,847, Cl. 425-204.000.

Hauenstein, Frederick M.: *See—*
Donahue, Raymond J.; Cleary, Terrance M.; Hauenstein, Frederick M.; and Marcellis, Daniel H., 4,875,517, Cl. 164-34.000.

Haumschild, Daniel J.: *See—*
Borgos, John A.; Bradac, Francis; Haumschild, Daniel J.; Johnson, Timothy; and Lee, Rebecca, 4,875,755, Cl. 350-96.200.

Hausz, Alfred F.: *See—*
Schlag, Johannes; Koehnlein, Ernst; Bauer, Peter; Koessler, Ludwig; and Hausz, Alfred F., 4,876,147, Cl. 428-379.000.

Hawener, Juergen: *See—*
Gietzen, Staas; Weiner, Hans; Hain, Klaus; Hofbauer, August; and Hawener, Juergen, 4,875,643, Cl. 244-53.00A.

Hawker, Michael J., to Clayton Dewandre Co. Ltd. Solenoid operated hydraulic control valve. 4,875,742, Cl. 303-119.000.

Hawkins, Junior F. Sanitary hand dryer. 4,876,435, Cl. 219-364.000.

Hawkins, William G.: *See—*
O'Neill, James F.; Drake, Donald J.; and Hawkins, William G., 4,875,968, Cl. 156-633.000.

Hawley, Dan W.: *See—*
Brewer, Terry L.; Hawley, Dan W.; Lamb, James E.; Latham, William J.; and Stichnote, Lynn K., 4,876,165, Cl. 430-7.000.

Hay, George H.; and Bleke, Jeffrey P., to Infrared Waste Technology, Inc. Mobile hazardous waste treatment system. 4,875,420, Cl. 110-215.000.

Hayakawa, Toshimasa: *See—*
Karube, Yoshiyuki; Hayakawa, Toshimasa; and Yoshida, Yasunari, 4,875,790, Cl. 400-605.000.

Hayano, Makoto: *See—*
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.

Hayashi, Kazuyuki: *See—*
Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, 4,876,681, Cl. 370-60.000.

Hayashi, Kotaro; Ito, Sumio; and Kobashi, Kiyoshi, to Toyota Jidosha Kabushiki Kaisha. Exhaust gas emission control device for diesel engine. 4,875,336, Cl. 60-286.000.

Hayashi, Tadamasa: *See—*
Ohkubo, Kazuo; Hayashi, Tadamasa; and Nagai, Hiroshi, 4,876,006, Cl. 210-321.690.

Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, to Honda Giken Kogyo Kabushiki Kaisha. Shift control device for hydrostatic continuously variable transmission. 4,875,390, Cl. 74-731.000.

Hays, Dan A., to Xerox Corporation. Printing apparatus including apparatus and method for charging and metering toner particles. 4,876,575, Cl. 355-259.000.

Hazard, James T. Toilet seat handle of unitary construction. 4,875,251, Cl. 16-111.00R.

Hazeltine Corp.: *See—*
Lopez, Alfred R., 4,876,548, Cl. 342-368.000.

HC Power, Inc.: *See—*
Colver, Frank, 4,876,497, Cl. 323-211.000.

Head, James D.; Burns, Edward F.; Schleizer, William A.; White, C. Douglas; and Gentry, Dennis L., to BMI, Inc. Method and apparatus for relining blast furnace. 4,875,662, Cl. 266-44.000.

Heenan, Richard H.: *See—*
Burke, Robert W., II; Cahen, Albert J., Jr.; Credle, William S., Jr.; Gupta, Ashis S.; and Heenan, Richard H., 4,875,508, Cl. 141-2.000.

Heger, Werner; Kramer, Manfred; and Schlossarczyk, Heinrich, to WABCO Westinghouse Fahrzeugbremsen GmbH. Stop for compressor plate valve. 4,875,503, Cl. 137-856.000.

Hegger, Josef: *See—*
Ostrup, Heinrich; and Hegger, Josef, 4,875,331, Cl. 56-208.000.

Heh, Shiang-Jiun; Chen, Swe-Kai; Jin, Fu-Teh; and Chen, Li-Kou, to Industrial Technology Research Institute. Process for producing rare earth-cobalt permanent magnet. 4,875,946, Cl. 148-103.000.

Heidinger, George H.: *See—*
Evans, Vernon C.; and Heidinger, George H., 4,876,514, Cl. 324-556.000.

Heikkila, Kurt E.; Williams, Rodney K.; and Bohnen, Bruce A., to Du Pont de Nemours, E. I., and Company. Hydrogen peroxide compositions containing a substituted aminobenzaldehyde. 4,875,973, Cl. 156-664.000.

Heikkila, Kurt E.: *See—*
Williams, Rodney K.; Bohnen, Bruce A.; and Heikkila, Kurt E., 4,875,972, Cl. 156-664.000.

Heine, Hans-Georg; and Ooms, Pieter, to Bayer Aktiengesellschaft. β-fluoroacyl-β-halovinyl alkyl ethers. 4,876,393, Cl. 568-415.000.

Hellsten, Martin, to Berol Kemi AB. Package capable of preventing foam formation, method of manufacturing such a package, and antifoaming agent. 4,876,122, Cl. 428-34.100.

Helton, Catherine; and Wright, Tim. Collapsible paperboard pallet. 4,875,419, Cl. 108-56.100.

Hemmann, Siglinde: *See—*
Blum, Helmut; and Hemmann, Siglinde, 4,876,339, Cl. 540-450.000.

Hemmerling, Wolfgang; Dubal, Hans-Rolf; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, to Hoechst Aktiengesellschaft. Chiral aryl-2,3-epoxyalkyl-ethers and the corresponding thio compounds thereof, and the use thereof as dopes in liquid-crystal phases. 4,876,028, Cl. 252-299.610.

Hemsky, Robert L.: *See—*
Orsburn, Michael L.; Hemsky, Robert L.; Tucker, Terry L.; Schwarz, Robert E.; and Fearing, Craig F., 4,876,589, Cl. 358-22.000.

Henigue, Christian, to Equipments Et Composants Pour L'Industrie Automobile. Lightened steering wheel, in particular for a motor vehicle, produced from stampable, reinforced, synthetic materials and process for the manufacture thereof. 4,875,387, Cl. 74-552.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Blum, Helmut; and Hemmann, Siglinde, 4,876,339, Cl. 540-450.000.
Breitzke, Willi; and Hensen, Hermann, 4,876,035, Cl. 252-550.000.

Hennig, Jurgen; Vetter, Heinz; and Munzer, Manfred, to Rohm GmbH Chemische Fabrik. Opaque synthetic resins. 4,876,311, Cl. 525-229.000.

Henricksen, Ronald M.: *See—*
Carlton, Dale E.; Baker, Clifford E.; and Henricksen, Ronald M., 4,876,655, Cl. 364-487.000.

Hensen, Hermann: *See—*
Breitzke, Willi; and Hensen, Hermann, 4,876,035, Cl. 252-550.000.

Henzel, Richard P., to Eastman Kodak Company. Thermally-transferable fluorescent oxazoles. 4,876,234, Cl. 503-227.000.

Hercules Incorporated: *See—*
Policelli, Frederick J., 4,875,717, Cl. 285-149.000.

Herding GmbH Entstaubungsanlagen: *See—*
Herding, Walter; and Rausch, Walter, 4,876,288, Cl. 521-53.000.

Herding, Walter; and Rausch, Walter, to Herding GmbH Entstaubungsanlagen. Carrier material for immobilization of microorganisms. 4,876,288, Cl. 521-53.000.

Hermach, Carl J., to Publishers Equipment Corporation. Conversion of letterpress to offset printing. 4,875,936, Cl. 101-218.000.
Hermann, Dietrich E.; and Holzhauer, Ralf, to Otis Elevator Company. Escalator handrail drive. 4,875,568, Cl. 198-335.000.
Hernandez, Henry R.: *See*—
Solarek, Daniel B.; Dirscherl, Teresa A.; Hernandez, Henry R.; and Jarowenko, Wadym, 4,876,336, Cl. 536-109.000.
Herscher, Bret A., to Wavetek Microwave, Inc. True RMS power demodulation system and method for a modulated RF signal. 4,876,654, Cl. 364-483.000.
Herschitz, Roman; Bogorad, Alexander; and Harhigh, Robert N., to General Electric Company. Preweld test method. 4,876,430, Cl. 219-110.000.
Herzig, Paul: *See*—
Tzikas, Athanassios; and Herzig, Paul, 4,876,334, Cl. 534-632.000.
Hesterberg, William G.: *See*—
Donahue, Raymond J.; Hesterberg, William G.; and Cleary, Terrance M., 4,875,985, Cl. 204-64.00T.
Heubner, Ulrich: *See*—
Rockel, Manfred; Wallis, Ernst; Kohler, Michael; Heubner, Ulrich; and Kirchheiner, Rolf, 4,876,065, Cl. 420-582.000.
Hewett, Richard H.; and Luscombe, Brian M., to May & Baker Limited. Herbicidal method using diflufenican. 4,875,925, Cl. 71-94.000.
Hewlett-Packard Company: *See*—
Kjosness, David P.; and Marriott, Joe E., 4,876,520, Cl. 333-12.000.
Lesko, Alan J., 4,876,702, Cl. 375-120.000.
Pennington, Roy E., 4,875,861, Cl. 439-79.000.
Tullis, Barclay J.; Bailey, John S.; Gunawardena, D. R.; and Kaempf, Ulrich, 4,875,825, Cl. 414-786.000.
Wong, Roger W.; Vifian, Hugo; and Hart, Michael G., 4,875,859, Cl. 434-214.000.
Hicks, Gary D., to Way Construction, Inc. Temporary support surfaces for use on muddy or marshy land areas. 4,875,800, Cl. 404-35.000.
Higashi, Katsumi: *See*—
Oda, Noriyuki; Takehara, Tetsuo; Higashi, Katsumi; and Muramatsu, Keiji, 4,875,712, Cl. 285-47.000.
Higashi, Kazumi; and Noda, Yuzuru, to Nitto Electric Industrial Co., Ltd. Colorless transparent polyimide shaped article and process for producing the same. 4,876,330, Cl. 528-353.000.
Higbie, Francis A.; LieBerman, Robert A.; and Rose, Ira M., to Diamond Shamrock Chemicals Co. Radiation-hardenable diluents. 4,876,384, Cl. 560-224.000.
Higgins, George D.: *See*—
McCain, William B.; and Higgins, George D., 4,875,669, Cl. 270-54.000.
Higgins, Sheryl W., to Cordis Corporation. Catheter with coiled wire attachment. 4,875,481, Cl. 128-344.000.
Hightech Receptor AB: *See*—
Bjorck, Lars; Erntell, Mats; and Myhre, Erling, 4,876,194, Cl. 435-68.000.
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, to Sanden Corporation. Wobble plate type compressor with variable displacement mechanism. 4,875,834, Cl. 417-269.000.
Hiketa, Manabu, to Mazda Motor Corporation. Vehicle four wheel drive system. 4,875,978, Cl. 180-248.000.
Hilderbrandt, Bodo; and Steigerwald, Franz, to Wella Aktiengesellschaft. Multichamber container. 4,875,577, Cl. 206-219.000.
Hill, Wayne E.; and McEachern, Dennis, to Marley Company, The. Method and apparatus for detecting leakage in fuel storage and delivery systems. 4,876,530, Cl. 340-605.000.
Hillenbrand, Gary F., to Mead Corporation, The. Imaging method employing photoadhesive microparticles. 4,876,172, Cl. 430-253.000.
Hilton, Robert; Emamjomeh, Ali; and Belani, Jagdish, to National Semiconductor Corporation. One-piece interconnection package and process. 4,876,587, Cl. 357-70.000.
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, to BASF Aktiengesellschaft. 3,4-dihydro-2H-pyrans useful as pesticides. 4,876,275, Cl. 514-452.000.
Hinduja, Murli; Thompson, Mark L.; and Spriggs, John R., to Sterling Engineered Products Inc. Apparatus and method for testing flow characteristics of molding compounds. 4,875,363, Cl. 73-56.000.
Hirai, Hiroyuki, to Fuji Photo Film Co., Ltd. Silver salt diffusion transfer with complexing compound. 4,876,171, Cl. 430-203.000.
Hirai, Hitoshi: *See*—
Urata, Kaoru; Nakashio, Miaki; Ono, Koichi; Hirai, Hitoshi; and Iwamoto, Masayuki, 4,876,703, Cl. 377-62.000.
Hirano, Norimitsu: *See*—
Shiraki, Manabu; and Hirano, Norimitsu, 4,876,472, Cl. 30-198.000.
Hirao, Sumio: *See*—
Tsuchida, Hirofumi; Tanaka, Toshiaki; Oyamada, Akira; and Hirao, Sumio, 4,875,444, Cl. 123-270.000.
Hirao, Yutaka; Takechi, Kazuo; Uriyu, Katuhiro; and Uemura, Yahiro, to Green Cross Corporation. Gamma-globulin injectable solutions containing sorbitol. 4,876,088, Cl. 424-85.800.
Hiraoka, Mizuho: *See*—
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,876,042, Cl. 264-39.000.
Hirasawa, Hideaki; and Ueda, Nobuo, to Minolta Camera Kabushiki Kaisha. Microfiche reading apparatus. 4,875,768, Cl. 353-27.00A.
Hirata, Toichi: *See*—
Sugiyama, Genroku; Hirata, Toichi; and Satoh, Shinichi, 4,875,337, Cl. 60-421.000.
Hirayama, Koji; and Aiyama, Fumihiko, to Kioritz Corporation. Throttle lever mechanism. 4,875,384, Cl. 74-500.500.
Hirono, Atsuyuki: *See*—
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,876,446, Cl. 250-221.000.
Hirose, Maki: *See*—
Imura, Takeshi; Ando, Katsuhiko; Nakabayashi, Shigemitsu; and Hirose, Maki, 4,875,518, Cl. 164-119.000.
Hirota, Hajime; Ogino, Hidekazu; Igarashi, Sahoko; and Sotoya, Koh-shiro, to Kao Corporation. Secondary amidoamino acid based detergent composition. 4,876,034, Cl. 252-546.000.
Hisanaga, Yorisato; Shimokawa, Kazuhiro; Kawano, Toshihiko; Suita, Yasunori; and Yamashita, Tsuneo, to Daikin Industries Ltd. Fluorine-containing macrolide compounds and their use. 4,876,245, Cl. 514-29.000.
Hitachi Automotive Engineering Co., Ltd.: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.
Hitachi Construction Machinery Co., Ltd.: *See*—
Sugiyama, Genroku; Hirata, Toichi; and Satoh, Shinichi, 4,875,337, Cl. 60-421.000.
Hitachi, Ltd.: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.
Akahoshi, Haruo; Murakami, Kanji; Kawamoto, Mineo; Tadokoro, Akio; and Yoshimura, Toyofusa, 4,876,177, Cl. 430-313.000.
Aoyama, Motoo; Bessho, Yasunori; Uchikawa, Sadao; Takeda, Renzo; and Ishii, Yoshihiko, 4,876,062, Cl. 376-444.000.
Gotou, Shizuo; Kagimasa, Toyohiko; and Yoshizumi, Seiichi, 4,876,646, Cl. 364-200.000.
Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, 4,876,681, Cl. 370-60.000.
Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, 4,875,618, Cl. 228-179.000.
Susa, Kenzo; Takagi, Kazumasa; Kobayashi, Toshio; Takayama, Takanobu; and Ohta, Norio, 4,876,144, Cl. 428-336.000.
Takeda, Kazuo; Ito, Yoshitoshi; Honma, Noriaki; and Munakata, Chusuke, 4,876,458, Cl. 250-574.000.
Usami, Saburo; Uchiyama, Kyoichi; and Suzuki, Satoshi, 4,875,837, Cl. 417-407.000.
Hitachi Maxell, Ltd.: *See*—
Mizutani, Hikaru, 4,875,640, Cl. 242-198.000.
Sugiyama, Toshinori; Ikegaki, Tetsurou; Shimizu, Mitsuru; and Tuburaya, Yoshitane, 4,876,133, Cl. 428-64.000.
Hitachi Microcomputer Hitachi, Ltd. & Engineering, Ltd.: *See*—
Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, 4,876,669, Cl. 365-189.010.
Hitachi Seiko, Ltd.: *See*—
Kashima, Takayuki; Sakabe, Akira; and Yamanaka, Yoshifumi, 4,876,433, Cl. 219-130.510.
Hitomi, Mitsuo: *See*—
Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, 4,875,455, Cl. 123-568.000.
Hjorth, John S. M.: *See*—
Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., 4,876,284, Cl. 514-657.000.
Ho, Ling-Wen: *See*—
Lin, Trong-Goang; Ho, Ling-Wen; Ko, An-Nan; and Perng, Yeong-Ju, 4,876,398, Cl. 568-804.000.
Hoagland, Lawrence C.: *See*—
Steele, Donald F.; Hoagland, Lawrence C.; Kyricos, Christopher; and Tolan, Peter, 4,875,520, Cl. 165-10.000.
Hock, Lothar: *See*—
Haan, Franz; and Hock, Lothar, 4,875,285, Cl. 29-832.000.
Hoden Seimitsu: *See*—
Inoue, Satoru; and Futamura, Shoji, 4,875,264, Cl. 29-163.600.
Hodges, John C.; and Klutchko, Sylvester, to Warner-Lambert Company. Process for statine and statine analogs. 4,876,343, Cl. 544-168.000.
Hodgson, Gordon; Broadhead, Douglas G.; and Parent, David J., to AHA Automotive Technologies Corporation. Reduced size transmission tunnel in an automobile and a method for the same. 4,875,538, Cl. 180-379.000.
Hoechst Aktiengesellschaft: *See*—
Hemmerling, Wolfgang; Dubal, Hans-Rolf; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,876,028, Cl. 252-299.610.
Paschke, Klaus; Crass, Guenther; and Dinter, Peter, 4,875,963, Cl. 156-249.000.
Schutz, Joachim; and Schweikert, Otto E., 4,876,341, Cl. 544-2.000.
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.
Thoese, Klaus; and Jung, Karl-Heinz, 4,876,155, Cl. 428-480.000.

Hoechst Celanese Corporation: *See—*
Broussard, Jerry A.; Fuqua, Wayne C.; and George, James H., 4,876,368, Cl. 549-374.000.

Hoehener, Alfred; and Smith, Roy E., to Ciba-Geigy Corporation. β-crystalline modification of diasazo acid dyestuff. 4,876,333, Cl. 534-575.000.

Hofbauer, August: *See—*
Gietzen, Staas; Weiner, Hans; Hain, Klaus; Hofbauer, August; and Hawener, Juergen, 4,875,643, Cl. 244-53.00A.

Hoffend, Thomas R.: *See—*
Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., 4,876,169, Cl. 430-110.000.

Hoffman, Brian: *See—*
Hutchinson, James; Hoffman, Brian; and Pollack, Steven, 4,875,275, Cl. 29-568.000.

Hoffman, William F.; Lee, Ta J.; Smith, Robert L.; and Rooney, Clarence S., to Merck & Co., Inc. Antihypercholesterolemic compounds. 4,876,366, Cl. 514-570.000.

Hoffman, William F.: *See—*
Lee, Ta J.; Hoffman, William F.; and Rooney, Clarence S., 4,876,279, Cl. 514-510.000.

Hoffmann-La Roche Inc.: *See—*
Aschwanden, Werner; Imhof, Rene ; Jakob, Roland; and Kyburz, Emilio, 4,876,340, Cl. 540-461.000.
Barner, Richard; and Hubscher, Josef, 4,876,369, Cl. 549-411.000.
Klaus, Michael; and Weiss, Ekkehard, 4,876,349, Cl. 546-350.000.

Hofmann, Ernst: *See—*
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, 4,876,275, Cl. 514-452.000.

Hofmeister, Peter: *See—*
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, 4,876,275, Cl. 514-452.000.

Hohmann & Barnard, Inc.: *See—*
Hohmann, Ronald P., 4,875,319, Cl. 52-383.000.

Hohmann, Ronald P., to Hohmann & Barnard, Inc. Seismic construction system. 4,875,319, Cl. 52-383.000.

Hokari, Hiroshi: *See—*
Matsuzawa, Masafumi; Hokari, Hiroshi; Kusano, Shoji; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,875,930, Cl. 71-106.000.

Hokkai Can Co., Ltd.: *See—*
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.

Holbrook, Gerald L.: *See—*
Leising, Maurice B.; Benford, Howard L.; and Holbrook, Gerald L., 4,875,391, Cl. 74-866.000.

Hollander, Zeev; Salomon, Beka; and Katchalski-Katzir, Ephraim, to Ramot University Authority for Applied Research and Industrial Development Ltd. Immobilization of biologically active substances with carrier bond antibody. 4,876,191, Cl. 435-7.000.

Hollenstein, Helmut, to Julius Blum Gesellschaft m.b.H. Drawer. 4,875,747, Cl. 312-330.100.

Hollister, Graham, Jr. Wood splitting method and apparatus. 4,875,514, Cl. 144-367.000.

Holm, Sune, deceased (Elisabet, Ingrid Birgitta, nee Jansson, Eva Christina Holm, Claes Frederick Holm, executors); Malmberg, Rolf; and Svensson, Kjell, to Alfa-Laval Food and Dairy Engineering AB. Method for producing milk with a lowered bacterial content. 4,876,100, Cl. 426-491.000.

Holman, James L.; and Willford, George A., to Dana Corporation. Dual ratio transmission shifter assembly with neutral safety switch. 4,875,383, Cl. 74-473.00R.

Holmes, Thomas: *See—*
Walker, John C.; and Holmes, Thomas, 4,876,528, Cl. 340-442.000.

Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Burggraf, Peter, to Holter, Heinz. Device for detecting different pollutants in gas streams. 4,875,406, Cl. 98-2.010.

Holtermann, Henri, to Laboratories Biotrol. Filter system with an incorporated gas escape opening, intended to be fitted in artificial anus drainage bags during their manufacture. 4,875,899, Cl. 604-333.000.

Holton, Robert A.; Juo, Rouh-Rong; and Lowenthal, Richard, to Research Corporation Technologies, Inc. Taxols, their preparation and intermediates thereof. 4,876,399, Cl. 568-817.000.

Holzhauer, Juergen K.; Michalak, Dennis J.; and Schammel, Wayne P., to Amoco Corporation. Process for the oxidation of di- or trimethylbenzenes in the presence of cobalt and manganese from oxidation residue incinerator ash. 4,876,386, Cl. 562-414.000.

Holzhauer, Ralf: *See—*
Hermann, Dietrich E.; and Holzhauer, Ralf, 4,875,568, Cl. 198-335.000.

Holzmeister, John P.; and Holzmeister, June. Anatomical measuring device. 4,875,296, Cl. 33-770.000.

Holzmeister, June: *See—*
Holzmeister, John P.; and Holzmeister, June, 4,875,296, Cl. 33-770.000.

Hombu, Mitsuyuki: *See—*
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Fuse, Genzo; Miwa, Hiroshi; and Kawasaki, Yoshinobu, 4,875,823, Cl. 414-735.000.
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.
Imura, Takeshi; Ando, Katsuhiko; Nakabayashi, Shigemitsu; and Hirose, Maki, 4,875,518, Cl. 164-119.000.
Kiuchi, Takeo; and Sakurai, Hidetoshi, 4,875,447, Cl. 123-339.000.
Kubota, Shin'ichi; Miyano, Hideyo; and Adachi, Hiromitsu, 4,876,529, Cl. 340-450.300.
Suzuki, Shigeru; and Shimida, Shinichi, 4,875,438, Cl. 123-52.0MB.
Yamamoto, Yasuhiro, 4,875,273, Cl. 29-467.000.
Yoshikawa, Haruhiko; and Kawai, Makoto, 4,875,450, Cl. 123-425.000.

Honda, Iwakazu, to Sharp Kabushiki Kaisha. Manually operated copier with a damper. 4,876,613, Cl. 358-471.000.

Honda, Kazuyuki: *See—*
Suzuki, Yasuhito; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, 4,876,562, Cl. 346-160.000.

Honeywell, Inc.: *See—*
Clancy, Kevin F., 4,876,415, Cl. 200-5.00A.
Dawson, John F.; Thompson, Eldon J.; and Cousens, James A., 4,876,651, Cl. 364-449.000.

Honma, Noriaki: *See—*
Takeda, Kazuo; Ito, Yoshitoshi; Honma, Noriaki; and Munakata, Chusuke, 4,876,458, Cl. 250-574.000.

Honma, Toshio; and Watanabe, Nobuyuki, to Canon Kabushiki Kaisha. Image processing apparatus. 4,876,612, Cl. 358-474.000.

Hoo, Kee K., to Tektronix, Inc. Extension handle for a circuit board injector/ejector mechanism. 4,875,867, Cl. 439-157.000.

Hood, William M.: *See—*
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.

Hopkins, H. Kenneth: *See—*
Luebbe, Richard J.; and Hopkins, H. Kenneth, 4,875,778, Cl. 356-394.000.
Luebbe, Richard J.; and Hopkins, H. Kenneth, 4,875,779, Cl. 356-394.000.

Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, to Kao Corporation. P-hydroxycinnamamide derivatives and melanin inhibitor comprising the same. 4,876,084, Cl. 424-62.000.

Hori, Tetsuhiro: *See—*
Toda, Kenichi; and Hori, Tetsuhiro, 4,876,071, Cl. 422-133.000.

Hori, Toshio: *See—*
Sakamoto, Yukio; Tanabe, Takeshi; Fukutani, Iwao; and Hori, Toshio, 4,875,862, Cl. 439-79.000.

Horikawa, Kazuo, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,876,452, Cl. 250-327.200.

Horiki, Akira: *See—*
Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, 4,876,681, Cl. 370-60.000.

Horowitz, Carl: *See—*
Lee, Andrew J.; Sanduja, Mohan L.; Sugathan, Kenneth; Dragnea, Felicia; and Horowitz, Carl, 4,875,410, Cl. 101-170.000.

Horton, Jack, to Murdock, Inc. Process for dry fiber winding and impregnating of projectiles. 4,876,050, Cl. 264-102.000.

Horton, Raymond R.: *See—*
Cipolla, Thomas M.; Horton, Raymond R.; Murphy, Philip; and Palmer, Michael J., 4,875,614, Cl. 228-5.500.

Hoshi, Mitsunori: *See—*
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.

Hoshiko, Tomonori: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Hosiden Electronics Co., Ltd.: *See—*
Tanaka, Masanori, 4,875,872, Cl. 439-344.000.

Hosoi, Yuichi: *See—*
Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, 4,876,161, Cl. 428-691.000.

Hosokawa, Hiroshi: *See—*
Ohsawa, Hidefumi; Katayama, Akihiro; Hosokawa, Hiroshi; Sunohara, Izuru; and Yoshimoto, Masahiko, 4,876,610, Cl. 358-443.000.

Hosono, Masaki: *See—*
Inui, Masaki; Okuda, Shozo; and Hosono, Masaki, 4,875,566, Cl. 192-53.00F.

Hosoya, Toshifumi: *See—*
Masuda, Shigeo; and Hosoya, Toshifumi, 4,875,758, Cl. 350-96.300.

Hotate, Makoto: *See—*
Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, 4,875,455, Cl. 123-568.000.

Hotomi, Hideo; Osawa, Izumi; Iino, Syuji; Doi, Isao; and Fujiwara, Masanori, to Minolta Camera Kabushiki Kaisha. Photosensitive member comprising charge generating layer and charge transporting layer comprising amorphous carbon containing chalogen or transition metal. 4,876,168, Cl. 430-58.000.

Hotta, Tomio: *See—*
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, 4,875,607, Cl. 222-643.000.

Hou, Donald; Wong, Yee-Shing; Gala, Dinesh; and Steinman, Martin, to Schering Corporation. Synthesis of azetidinones using CuCl. 4,876,338, Cl. 540-357.000.

Houng, Charles C.: *See—*
Luchaco, David G.; and Houng, Charles C., 4,876,498, Cl. 323-300.000.

Houston, Albert C.: *See—*
Ma, John Y.; and Houston, Albert C., 4,876,739, Cl. 455-266.000.

Howard, Paul L.: *See—*
Osterhout, Ralph F.; Howard, Paul L.; and Light, Greta G., 4,876,632, Cl. 362-183.000.

Hoxmeier, Ronald J.; and Slaugh, Lynn H., to Shell Oil Company. Hydrogenation process. 4,876,314, Cl. 525-338.000.

Hoyt, John M.; and Blazey, Steven D., to National Distillers and Chemical Corporation. Process for vulcanizing saturated elastomers with halogen cure sites. 4,876,315, Cl. 525-346.000.

Hrinda, Michael E.: *See—*
Feldman, Fred; Klekamp, Mark S.; Hrinda, Michael E.; Shaw, Arthur B.; and Chandra, Sudhish, 4,876,241, Cl. 514-2.000.

Hsieh, C. Richard; King, Desmond F.; Pettersen, Frederick A.; and Shargay, Cathleen A., to Chevron Research Company. Method for liquid feed dispersion in fluid catalytic cracking systems. 4,875,996, Cl. 208-157.000.

Hsu, Fu-Chieh, to Integrated Device Technology, Inc. Method of making a static ram cell with trench pull-down transistors and buried-layer ground plate. 4,876,215, Cl. 437-60.000.

Hsu, Kevin; Rao, Srinivas T.; and Kaukeinen, Joseph Y., to Eastman Kodak Company. Method of making a fiber optic array. 4,875,969, Cl. 156-633.000.

Huang, Chin-Teh: *See—*
Jefferies, Steven R.; and Huang, Chin-Teh, 4,875,858, Cl. 433-226.000.

Huang, Jin L.: *See—*
Huang, Jin S.; and Huang, Jin L., 4,875,849, Cl. 425-589.000.

Huang, Jin S.; and Huang, Jin L. Rubber shaping machine. 4,875,849, Cl. 425-589.000.

Hubscher, Josef: *See—*
Barner, Richard; and Hubscher, Josef, 4,876,369, Cl. 549-411.000.

Huels Troisdorf AG: *See—*
Rauleder, Hartwig; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,876,337, Cl. 556-415.000.

Huffman, David C.: *See—*
Coulston, John W.; and Huffman, David C., 4,875,627, Cl. 239-466.000.

Hughes Aircraft Company: *See—*
Kanber, Hilda; and Chen, James C., 4,876,211, Cl. 437-22.000.
Lucero, David J.; Parazzoli, Claudio G.; and Mangir, Metin S., 4,876,693, Cl. 372-82.000.
Wirick, Michael P., 4,876,453, Cl. 250-332.000.
Zwirn, Robert; and Rafanelli, Gerard L., 4,876,602, Cl. 358-227.000.

Hughes, Arlen J.; and Strahan, Virgil H., to United States of America, Air Force. Radiation-induced substrate photo-current compensation apparatus. 4,876,583, Cl. 357-23.700.

Hughes, John L., to Advanced Lasers Limited. External cavity slab lasers. 4,876,694, Cl. 372-93.000.

Hughes, Leonard; Fuller, James G.; and Earl, Gary W., to Sherex Chemical Company, Inc. Powdered imidazoline product and method for producing same. 4,876,355, Cl. 548-352.000.

Huls Aktiengesellschaft: *See—*
Bartmann, Martin, 4,876,310, Cl. 525-149.000.

Huntington, David H.: *See—*
Dickenson, Haydn G. W.; and Huntington, David H., 4,876,023, Cl. 252-90.000.

Huse, Syoji: *See—*
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.

Hutchinson, James; Hoffman, Brian; and Pollack, Steven, to Megamation Incoporated. Novel automatic tool changer. 4,875,275, Cl. 29-568.000.

Hwo, Charles C., to Shell Oil Company. Film and sheet capable of forming retortable and easy-open packagings. 4,876,156, Cl. 428-516.000.

Hydromer, Inc.: *See—*
Creasy, Walter S.; and Lorenz, Donald H., 4,875,287, Cl. 30-34.010.

Hyodo, Hiroshi: *See—*
Inoue, Kazushige; Yamamoto, Hiroshi; Hyodo, Hiroshi; and Kishimoto, Shinichi, 4,876,204, Cl. 436-46.000.

I.M.A. - Industrie Macchine Automatiche S.p.A.: *See—*
Miselli, Carlo A., 4,875,329, Cl. 53-559.000.

I.PI.CI. S.p.A.: *See—*
Ravetta, Guido, 4,876,388, Cl. 564-437.000.

IBP Pietzsch Gmbh: *See—*
Pietzsch, Ludwig; Senger, Detlef; Winter, Horst; and Vollinger, Hubert, 4,876,600, Cl. 358-183.000.

Ichihashi, Kouji; and Yasuma, Jun-ichi, to Diesel Kiki Co., Ltd. Electromagnetic proportional control valve apparatus. 4,875,501, Cl. 137-625.640.

Ide, Jun; and Iizumi, Tomoo, to Alps Electric Co., Ltd. Method for detecting zero track. 4,876,618, Cl. 360-78.130.

Ide, Mason G.; Lawrence, Noel L. W.; and Prager, Lee, to GTE Products Corporation. PTC air heater enploying triangular PTC heating elements. 4,876,436, Cl. 219-370.000.

Ide, Naoaki: *See—*
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, 4,876,560, Cl. 346-153.100.

IDN Inventions and Development of Novelties AG: *See—*
Ackeret, Peter, 4,875,584, Cl. 206-387.000.

Ifuku, Tetsuhiko: *See—*
Shioya, Katsuhiko; Ifuku, Tetsuhiko; and Inamasu, Seiichi, 4,876,645, Cl. 364-200.000.

Igarashi, Sahoko: *See—*
Hirota, Hajime; Ogino, Hidekazu; Igarashi, Sahoko; and Sotoya, Kohshiro, 4,876,034, Cl. 252-546.000.

Igelbuscher, Heinrich: *See—*
Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Burggraf, Peter, 4,875,406, Cl. 98-2.010.

Iida, Toshikatsu; Fujiwara, Takayoshi; and Fukuda, Tetsuo, to Kabushiki Kaisha Toshiba. Axial flow fluid compressor. 4,875,842, Cl. 418-220.000.

Iino, Syuji: *See—*
Hotomi, Hideo; Osawa, Izumi; Iino, Syuji; Doi, Isao; and Fujiwara, Masanori, 4,876,168, Cl. 430-58.000.

Iizumi, Tomoo: *See—*
Ide, Jun; and Iizumi, Tomoo, 4,876,618, Cl. 360-78.130.

Ijichi, Kouichi: *See—*
Kobayashi, Sadao; Ishihara, Yuji; Sato, Katsuyuki; and Ijichi, Kouichi, 4,876,141, Cl. 428-217.000.

Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, to Sanyo Electric Co., Ltd.; and Saga Sanyo Industry Co., Ltd. Aluminum solid electrolytic capacitor and manufacturing method thereof. 4,876,451, Cl. 361-540.000.

Ikeda, Naotaka: *See—*
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, 4,875,607, Cl. 222-643.000.

Ikeda, Susumu, to Sanden Corporation. Temperature control means for a refrigerating apparatus. 4,875,342, Cl. 62-115.000.

Ikegaki, Tetsurou: *See—*
Sugiyama, Toshinori; Ikegaki, Tetsurou; Shimizu, Mitsuru; and Tuburaya, Yoshitane, 4,876,133, Cl. 428-64.000.

Ikumi, Tomonori: *See—*
Matsumoto, Yasuo; Murakami, Kazunori; Ikumi, Tomonori; and Iwafune, Yasuo, 4,875,748, Cl. 350-6.800.

Imai, Hitoshi; Okada, Kazuo; and Tadokoro, Michihiro, to Mitsubishi Denki Kabushiki Kaisha. Wavelength selective optical data storage system. 4,876,666, Cl. 365-106.000.

Imai, Teruo: *See—*
Aoyama, Takeo; Imai, Teruo; Hattori, Junichi; and Uehara, Mikio, 4,876,049, Cl. 264-49.000.

Imaizumo, Tomio, to Tokico Ltd. Damping force adjustable hydraulic shock absorber. 4,875,560, Cl. 188-319.000.

Imanishi Kinzoku Kogyo Kabushiki Kaisha: *See—*
Okamoto, Kenzo; and Kitada, Fumihiko, 4,875,721, Cl. 292-29.000.

Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, to Canon Kabushiki Kaisha. Molding processing using a reproducible molding die. 4,876,042, Cl. 264-39.000.

Imbert, Christian, to Medinvent S.A. Device for transluminal implantation. 4,875,480, Cl. 128-343.000.

Imhof, Rene : *See—*
Aschwanden, Werner; Imhof, Rene ; Jakob, Roland; and Kyburz, Emilio, 4,876,340, Cl. 540-461.000.

Imokawa, Genji: *See—*
Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, 4,876,084, Cl. 424-62.000.

Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, to Mitsubishi Jukogyo Kabushiki Kaisha; and Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Combustion chamber of a sub-chamber type internal combustion engine. 4,875,445, Cl. 123-292.000.

Imperial Chemical Industries PLC: *See—*
Anthony, Vivienne M.; Clough, John M.; DeFraine, Paul; and Godfrey, Christopher R. A., 4,876,264, Cl. 514-345.000.
Casci, John L.; Lowe, Barrie M.; and Lowe, Thomas V., 4,876,412, Cl. 585-640.000.
Cattanach, James B., 4,876,055, Cl. 264-512.000.
Elliott, Raymond; Griffin, David A.; and Gairns, Raymond S., 4,875,922, Cl. 71-76.000.
Prest, David W.; and Yorke, William J., 4,875,951, Cl. 149-109.600.
Tadros, Tharwat F., 4,875,927, Cl. 71-94.000.

Imreg, Inc. (Delaware corporation): *See—*
Gottlieb, A. Arthur, 4,876,193, Cl. 435-29.000.

Imura, Takeshi; Ando, Katsuhiko; Nakabayashi, Shigemitsu; and Hirose, Maki, to Honda Giken Kogyo Kabushiki Kaisha. Method of and apparatus for low-pressure casting of light metal alloy. 4,875,518, Cl. 164-119.000.

Inada, Yasuo: *See—*
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.

Inagaki, Jitsuo. Sterilizing method for treatment of fresh fruits and apparatus used for the method. 4,875,407, Cl. 99-451.000.

Inamasu, Seiichi: *See*—
Shioya, Katsuhiko; Ifuku, Tetsuhiko; and Inamasu, Seiichi, 4,876,645. Cl. 364-200.000.
Industrial Technology Institute: *See*—
Harding, Kevin G., 4,875,777, Cl. 356-376.000.
Industrial Technology Research Institute: *See*—
Heh, Shiang-Jiun; Chen, Swe-Kai; Jin, Fu-Teh; and Chen, Li-Kou, 4,875,946, Cl. 148-103.000.
Infrared Waste Technology, Inc.: *See*—
Hay, George H.; and Bieke, Jeffrey P., 4,875,420, Cl. 110-215.000.
Innovative Medical Engineering, Inc.: *See*—
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.
Inomata, Kenichi: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,875,835, Cl. 417-295.000.
Inoue, Hiromichi: *See*—
Saito, Shinichi; Inoue, Hiromichi; Miyazawa, Kazutoshi; Ohno, Kouji; and Ushioda, Makoto, 4,876,026, Cl. 252-299.610.
Inoue, Kazushige; Yamamoto, Hiroshi; Hyodo, Hiroshi; and Kishimoto, Shinichi, to Kabushiki Kaisha Kyoto Daiichi Kagaku. Method and apparatus of automatic continuous analysis using analytical implement. 4,876,204, Cl. 436-46.000.
Inoue, Koji: *See*—
Akao, Mutsuo; Osanai, Hiroyuki; and Inoue, Koji, 4,876,125, Cl. 428-35.200.
Inoue, Masanobu: *See*—
Mihara, Makoto; Inoue, Masanobu; Ohji, Kenzo; and Itou, Shuji, 4,875,533, Cl. 177-144.000.
Inoue, Satoru; and Futamura, Shoji, to NGK Insulators, Ltd.; and Hoden Seimitsu. Method for producing dies for extruding honeycomb structures. 4,875,264, Cl. 29-163.600.
Inoue, Takanori: *See*—
Hara, Kazuya; Inoue, Takanori; and Bito, Hiroyasu, 4,876,441, Cl. 235-488.000.
Inoue, Takashi: *See*—
Kawabata, Akira; Terasaki, Yoshikazu; Inoue, Takashi; and Takita, Hidenori, 4,876,479, Cl. 313-440.000.
Shimazu, Hideaki; Ito, Hiroshi; and Yamakoshi, Kenichi, 4,875,488, Cl. 128-694.000.
Integrated Device Technology, Inc.: *See*—
Hsu, Fu-Chieh, 4,876,215, Cl. 437-60.000.
Integrated Fluidics, Inc.: *See*—
Brackett, Tom S., 4,875,956, Cl. 156-84.000.
Intellipower, Inc.: *See*—
Johnson, Ronald W., 4,876,460, Cl. 307-64.000.
InterMetro Industries Corporation: *See*—
Welch, Robert J.; Kolvites, Albert; and White, Robert M., 4,875,696, Cl. 280-47.340.
Intermodal Container Systems: *See*—
Merrett, Ronald G.; and Eakin, Oscar, Jr., 4,875,811, Cl. 406-39.000.
International Business Machines Corporation: *See*—
Cipolla, Thomas M.; Horton, Raymond R.; Murphy, Philip; and Palmer, Michael J., 4,875,614, Cl. 228-5.500.
Kaneko, Toyohisa; and Watanuki, Osaaki, 4,876,720, Cl. 381-43.000.
Lavin, Mark A., 4,876,733, Cl. 382-27.000.
Martin, William C.; and Rohrer, Gene D., 4,876,735, Cl. 382-57.000.
Nuechterlein, David W.; and Rinaldi, Mark A., 4,876,644, Cl. 364-200.000.
Pence, Jerry W., 4,876,662, Cl. 364-900.000.
Phinney, Richard R.; and Strippe, David C., 4,876,114, Cl. 427-45.100.
Tseng, Samuel C., 4,876,607, Cl. 358-261.200.
International Flavors & Fragrances Inc.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.
Interprovincial Pipe Line Company: *See*—
Savard, Donald D., 4,875,615, Cl. 228-119.000.
Inui, Masaki; Okuda, Shozo; and Hosono, Masaki, to Toyota Jidosha Kabushiki Kaisha. Gear synchronizer mechanism. 4,875,566, Cl. 192-53.00F.
Inventio AG: *See*—
MacDonald, Robert C.; and Abrego, Elsa, 4,875,554, Cl. 187-124.000.
Isaka, Tsutomu; and Ohta, Saburo, to Toyo Boseki Kabushiki Kaisha. Anti-fogging multilayered film and bag produced therefrom for packaging vegetables and fruits. 4,876,146, Cl. 428-347.000.
Isaka, Yukio: *See*—
Suzuki, Yasuhito; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, 4,876,562, Cl. 346-160.000.
Ishida, Hiroaki; Shinozaki, Nobuo; and Nakazawa, Michitake, to Seikosha Co., Ltd. Motor-driven shutter for camera. 4,876,563, Cl. 354-234.100.
Ishiguro, Masanori: *See*—
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.
Ishihara, Yuji: *See*—
Kobayashi, Sadao; Ishihara, Yuji; Sato, Katsuyuki; and Ijichi, Kouichi, 4,876,141, Cl. 428-217.000.
Ishii, Yoh; Abe, Masami; Harada, Yuhzoh; Takasugi, Atsumi; and Kato, Kazumi, to Furukawa Aluminum Co., Ltd. Method of manufacturing hollow billet and apparatus therefor. 4,875,519, Cl. 164-465.000.
Ishii, Yoshihiko: *See*—
Aoyama, Motoo; Bessho, Yasunori; Uchikawa, Sadao; Takeda, Renzo; and Ishii, Yoshihiko, 4,876,062, Cl. 376-444.000.
Ishijima, Toshiyuki, to NEC Corporation. Field effect transistor with short channel length and process of fabrication thereof. 4,876,581, Cl. 357-23.300.
Ishikawa, Hitoshi, to Aisin Seiki Kabushiki Kaisha. Reduced height sewing machine with a arcuately swinging needle bar arm. 4,875,422, Cl. 112-258.000.
Ishikawa, Noboru: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.
Ishikawa, Osamu; and Sumiya, Kiyoshi, to Oki Electric Industry Co., Ltd. Image reading device. 4,876,605, Cl. 358-400.000.
Ishikawa, Takatoshi; and Yagihara, Morio, to Fuji Photo Film Co., Ltd. Method of processing silver halide color photosensitive material using developer comprising dialkyl hydroxylamine and no benzyl alcohol. 4,876,174, Cl. 430-380.000.
Ishikawa, Yoshihiko: *See*—
Kushida, Osami; Ninomiya, Hisamitsu; Nezuka, Masakazu; and Ishikawa, Yoshihiko, 4,876,523, Cl. 337-299.000.
Ishikura, Hisatugu: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.
Ishiwa, Hiromi; Shibahara, Harue; Mutai, Masahiko; and Tsuchida, Nobuo, to Kabushiki Kaisha Yakult Honsha. Chimeric plasmids. 4,876,202, Cl. 435-320.000.
Ishizaka, Yutaka: *See*—
Miyagawa, Michiaki; Ishizaka, Yutaka; and Shimomura, Shoji, 4,876,732, Cl. 382-41.000.
Ishizuka, Shigeo; and Kuzuno, Katsutoshi, to Yazaki Corporation. Multi-terminal connector. 4,875,873, Cl. 439-347.000.
Isola, Richard A., to Habitation. Bed clothes. 4,875,245, Cl. 5-482.000.
Isomura, Shigenori: *See*—
Sano, Ryuichi; and Isomura, Shigenori, 4,875,443, Cl. 123-179.00G.
Isono, Koichi; and Sho, Ikuo, to Dainippon Screen Mfg. Co., Ltd. Method of and apparatus for detecting presence or absence of photosensitive object at a prescribed position. 4,876,456, Cl. 250-561.000.
Issachar, David; Trumper, Jacob; and Abrashkin, Shmuel, to State of Israel, Prime Minister's Office Israel Atomic Energy Commission, Soreq Nuclear Research Center. Radionuclide generator. 4,876,073, Cl. 423-2.000.
Itaya, Keiji; and Kohayakawa, Hiromasa, to Kabushiki Kaisha Toshiba. Device for changing sheet shape before entry into fuser nip. 4,876,576, Cl. 355-285.000.
Ito, Hiroshi: *See*—
Shimazu, Hideaki; Ito, Hiroshi; and Yamakoshi, Kenichi, 4,875,488, Cl. 128-694.000.
Ito, Iko; Toyoshima, Yoshiki; Takagishi, Hisao; and Takahashi, Tsutomu, to Sumitomo Chemical Company, Limited. Process of producing glycidyl ethers of monohydric or polyhydric phenols. 4,876,371, Cl. 549-517.000.
Ito, Sumio: *See*—
Hayashi, Kotaro; Ito, Sumio; and Kobashi, Kiyoshi, 4,875,336, Cl. 60-286.000.
Ito, Takayasu: *See*—
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,876,446, Cl. 250-221.000.
Ito, Yoshitoshi: *See*—
Takeda, Kazuo; Ito, Yoshitoshi; Honma, Noriaki; and Munakata, Chusuke, 4,876,458, Cl. 250-574.000.
Itoh, Hajime; and Mitani, Kazutami, to Mitsubishi Rayon Co., Ltd. Hydrophilized porous membrane and production process thereof. 4,876,289, Cl. 521-54.000.
Itoh, Kunio; and Shiobara, Toshio, to Shin-Etsu Chemical Co., Ltd. Epoxy resin composition. 4,876,298, Cl. 523-433.000.
Itoh, Kunio; Fukushima, Motoo; and Nakamura, Tsutomu, to Shin-Etsu Chemical Co., Ltd. Novel organosilicon compounds. 4,876,344, Cl. 544-219.000.
Itoh, Mituru. Door apparatus. 4,875,306, Cl. 49-208.000.
Itou, Shinji: *See*—
Oshita, Saiichiro; Mouri, Toyohiko; Takahashi, Tsutomu; and Itou, Shinji, 4,875,541, Cl. 180-79.100.
Itou, Shuji: *See*—
Mihara, Makoto; Inoue, Masanobu; Ohji, Kenzo; and Itou, Shuji, 4,875,533, Cl. 177-144.000.
ITT Corporation: *See*—
Carlson, Christopher M.; and Deninno, Nicholas, 4,876,545, Cl. 342-14.000.
Dennany, Robert D., Jr.; and Pontbriand, Duane J., 4,875,715, Cl. 285-87.000.
Koerner, Charles B., 4,876,546, Cl. 342-15.000.
Ivanova, Irina A.: *See*—
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Iwafune, Yasuo: *See—*
Matsumoto, Yasuo; Murakami, Kazunori; Ikumi, Tomonori; and Iwafune, Yasuo, 4,875,748, Cl. 350-6.800.
Iwai, Isamu; Okamoto, Toshio; and Doi, Miwako, to Kabushiki Kaishi Toshiba. Document processing system deciding apparatus provided with selection functions. 4,876,665, Cl. 364-900.000.
Iwakura, Ken: *See—*
Saeki, Keiso; Sano, Shojiro; Matsuoka, Katsumi; Takashima, Masanobu; and Iwakura, Ken, 4,876,233, Cl. 503-209.000.
Iwamoto, Masayuki: *See—*
Urata, Kaoru; Nakashio, Miaki; Ono, Koichi; Hirai, Hitoshi; and Iwamoto, Masayuki, 4,876,703, Cl. 377-62.000.
Iwasa, Hiroki; Watanabe, Toyofumi; and Furuya, Hirohide, to NKK Corporation. Method for manufacturing electrolytically chromated steel sheet. 4,875,984, Cl. 204-56.100.
Iwasaki, Masayuki: *See—*
Maemoto, Kazuo; Iwasaki, Masayuki; Maeda, Minoru; and Aotani, Yoshimasa, 4,876,173, Cl. 430-271.000.
Iwatsuki, Kunihiro: *See—*
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.
Iwaya, Toshio, to Canon Kabushiki Kaisha. Image recording apparatus. 4,876,570, Cl. 355-204.000.
Ixys Corporation: *See—*
Arcus, Christopher G., 4,876,517, Cl. 330-277.000.
Izai, Sadamu: *See—*
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.
Izumina, Masanobu: *See—*
Hamakawa, Yoshihiro; Tawada, Yoshihisa; Tsuge, Kazunori; and Izumina, Masanobu, 4,875,943, Cl. 136-244.000.
J.M. Huber Corporation: *See—*
Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., 4,876,291, Cl. 521-124.000.
J. M. Voith GmbH: *See—*
Schiel, Christian, 4,875,975, Cl. 162-273.000.
Jacobi, Hatto: *See—*
Gronsfeld, Josef; Jacobi, Hatto; and Baethmann, Hans-Juergen, 4,875,371, Cl. 73-598.000.
Jacobs, Paul H.; and Collette, Douglas P., to General Signal Corporation. Method of receiving a compressed composite signal. 4,876,741, Cl. 455-47.000.
Jacques, Donald A.: *See—*
Vandenberg, Donald E.; Jacques, Donald A.; and Schaffer, William E., 4,875,765, Cl. 350-611.000.
Jagatich, Carl T.: *See—*
Gardner, Bronson; Keener, Melvin E.; DeSutter, Steven C.; Jagatich, Carl T.; and Felice, Ralph A., 4,876,647, Cl. 364-420.000.
Jager, Willem W.: *See—*
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,876,286, Cl. 518-700.000.
Jahn, Darrell D.: *See—*
Betts, Peter; and Jahn, Darrell D., 4,876,011, Cl. 210-526.000.
Jakob, Roland: *See—*
Aschwanden, Werner; Imhof, Rene ; Jakob, Roland; and Kyburz, Emilio, 4,876,340, Cl. 540-461.000.
James, Adrian W.: *See—*
Dekker, Nicolaas M. J.; Edwards, John W.; and James, Adrian W., 4,876,722, Cl. 381-71.000.
James Burn International Ltd.: *See—*
Jones, Leonard W. N., 4,875,355, Cl. 72-306.000.
Jamet, Michel R.: *See—*
Murray, Charles N.; and Jamet, Michel R., 4,875,429, Cl. 114-331.000.
Jan, Chaur-Ming; and Oehling, Mark E., to Warner-Lambert Company. Fluidized bed dryer/granulator. 4,875,435, Cl. 118-62.000.
Janai, Meir I.: *See—*
Orbach, Zvi; and Janai, Meir I., 4,875,971, Cl. 156-644.000.
Janning, John L., to NCR Corporation. Crystallized silicon-on-insulator nonvolatile memory device. 4,876,582, Cl. 357-23.500.
Japan as represented by Director General of Agency of Industrial Science and Technology: *See—*
Yabe, Akira; Ouchi, Akihiko; Moriyama, Hiroshi; and Masuda, Etsuro, 4,875,986, Cl. 204-157.600.
Japan Electronic Control Systems Company Limited: *See—*
Tomisawa, Naoki, 4,875,456, Cl. 123-585.000.
Jaran, John R.: *See—*
Ray, Robert; Neal, Robert A.; Jaran, John R.; and Parker, Tim, 4,875,581, Cl. 206-328.000.
Jarowenko, Wadym: *See—*
Solarek, Daniel B.; Dirscherl, Teresa A.; Hernandez, Henry R.; and Jarowenko, Wadym, 4,876,336, Cl. 536-109.000.
Jasper, Thomas E.: *See—*
Evans, Walter R.; Remenicky, Joseph M.; Jasper, Thomas E.; and Ballard, Wayne W., 4,875,351, Cl. 70-271.000.
Jefferies, Steven R.; and Huang, Chin-Teh, to Dentsply Research & Development Corp. Method and composition for detecting dentin. 4,875,858, Cl. 433-226.000.
Jefferson, Robert C. Gauge for determining depth of cut in keys and the like. 4,875,294, Cl. 33-539.000.
Jenkins, John M., III: *See—*
Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,876,320, Cl. 526-62.000.
Jenkins, Richard L. Six-axis joystick control. 4,876,524, Cl. 338-2.000.
Jensen, Van E., Jr.: *See—*
Donnay, James A.; Jensen, Van E., Jr.; and Kruzel, Bryon S., 4,875,895, Cl. 493-117.000.
Jeppsson, E. Hakan O. Climate chamber with conveyor. 4,875,343, Cl. 62-381.000.
Jet Research Center, Inc.: *See—*
Christopher, Glenn B.; and Motley, Jerry D., 4,875,413, Cl. 102-307.000.
Jin, Fu-Teh: *See—*
Heh, Shiang-Jiun; Chen, Swe-Kai; Jin, Fu-Teh; and Chen, Li-Kou, 4,875,946, Cl. 148-103.000.
Jinbo, Toshikatsu: *See—*
Kobatake, Hiroyuki; and Jinbo, Toshikatsu, 4,876,462, Cl. 307-246.000.
Joanino, Fernando A., to Advance Transformer Co. Two-lead starter circuit for a gaseous discharge lamp. 4,876,486, Cl. 315-290.000.
Job, Robert C., to Shell Oil Company. Magnesium alkoxide polymerization catalyst by boiling in organic solvents. 4,876,230, Cl. 502-171.000.
Jochimsen, Siegfried. Blood clotting time measuring apparatus. 4,876,069, Cl. 422-73.000.
Johansson, Anette M.: *See—*
Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., 4,876,284, Cl. 514-657.000.
Johansson, Eric B., to General Electric Company. Double-d water rod for 9 by 9 fuel bundle. 4,876,063, Cl. 376-444.000.
Johansson, Jan A.; Jonsson, Jan I.; and Lindstrom, Bjorn T., to Aktiebolaget Electrolux. Patient lifting device. 4,875,555, Cl. 187-9.00R.
Johansson, Nils B.: *See—*
Gustafsson, Bengt O.; and Johansson, Nils B., 4,876,074, Cl. 423-210.500.
John Fluke Mfg. Co., Inc.: *See—*
Guntheroth, Kurt, 4,876,684, Cl. 371-21.200.
Johns Hopkins University, The: *See—*
Devereux, William S.; and Westerfield, Edwin E., 4,876,659, Cl. 364-717.000.
Johnson, Bernard D.: *See—*
Torley, Lawrence W.; Johnson, Bernard D.; and Dusza, John P., 4,876,252, Cl. 514-224.800.
Johnson, Duane R.: *See—*
Larson, Scott A.; and Johnson, Duane R., 4,875,563, Cl. 192-4.00A.
Johnson Electric Industrial Manufactory, Limited: *See—*
Wang, Patrick S.-C.; and Baines, Roger F., 4,876,474, Cl. 310-236.000.
Johnson, Horton. Engine noise simulating device for a bicycle. 4,875,885, Cl. 446-189.000.
Johnson, Ronald W., to Intellipower, Inc. Uninterrupted power supply. 4,876,460, Cl. 307-64.000.
Johnson, Ruben R. Electrical service fittings and service system including same. 4,876,414, Cl. 174-81.000.
Johnson, Timothy: *See—*
Borgos, John A.; Bradac, Francis; Haumschild, Daniel J.; Johnson, Timothy; and Lee, Rebecca, 4,875,755, Cl. 350-96.200.
Johnson, William C.; Richardson, Hubert, Jr.; and Barito, Thomas R., to Tecumseh Products Company. Compressor lubrication system with vent. 4,875,840, Cl. 418-55.000.
Johnston, Bernard A. Combination metal and wood window frame assembly. 4,875,316, Cl. 52-204.000.
Johnston, James A. Method for manufacturing printed circuit boards. 4,875,283, Cl. 29-830.000.
Jones, Bruce A., to Digital Equipment Corporation. Constant flow deionized water spray gun. 4,875,625, Cl. 239-124.000.
Jones, Jack A.; Wen, Liang-Chi; and Bard, Steven, to United States of America, National Aeronautics and Space Administration. Two-statge sorption type cryogenic refrigerator including heat regeneration system. 4,875,346, Cl. 62-467.000.
Jones, Leonard W. N., to James Burn International Ltd. Manufacture of wire binding elements. 4,875,355, Cl. 72-306.000.
Jonsson, Jan I.: *See—*
Johansson, Jan A.; Jonsson, Jan I.; and Lindstrom, Bjorn T., 4,875,555, Cl. 187-9.00R.
Jorgensen, Betty S.: *See—*
Liepins, Raimond; Jorgensen, Betty S.; and Liepins, Leila Z., 4,876,032, Cl. 252-500.000.
Joseph, Philippe; and Perrochat, Jean Michel, to S.A.M.M. - Societe d'Applications des Machines Motrices. Hydropneumatic suspension unit for wheeled vehicles, particularly cross-country vehicles. 4,875,706, Cl. 280-708.000.
Joyce, Allen T.: *See—*
Bradley, Billie J.; Giroux, Richard L.; and Joyce, Allen T., 4,875,524, Cl. 166-241.000.
Julius Blum Gesellschaft m.b.H.: *See—*
Hollenstein, Helmut, 4,875,747, Cl. 312-330.100.
Rock, Erich; and Brustle, Klaus, 4,875,746, Cl. 312-330.100.
Jung, Karl-Heinz: *See—*
Thoese, Klaus; and Jung, Karl-Heinz, 4,876,155, Cl. 428-480.000.
Junker, Warren R.: *See—*
Brown, Stephen D.; Junker, Warren R.; and Gradich, Francis X., 4,876,506, Cl. 324-220.000.
Junkosha Co., Ltd.: *See—*
Akiba, Jyuji, 4,875,359, Cl. 73-40.000.
Juo, Rouh-Rong: *See—*
Holton, Robert A.; Juo, Rouh-Rong; and Lowenthal, Richard, 4,876,399, Cl. 568-817.000.
Just, Karl, to MTU Motoren- und Turbinen-Union Friedrichshafen GmbH. Divided slide bearing. 4,875,784, Cl. 384-273.000.

Justice, Kendall W. Truck bed load organizer and stabilizer apparatus. 4,875,730, Cl. 296-37.500.
J100 rgensen, Paul R., to Durgo AG. Resonance label and method for its fabrication. 4,876,555, Cl. 343-895.000.
K. Rutschi AG: *See*—
Zehnder, Paul; Niklaus, Hans-Ulrich; Schmiedl, Engelbert; and Patri, Franz, 4,875,836, Cl. 417-360.000.
Kaaden, Jurgen; and Schandl, Hartmut, to Deutsche Thomson-Brandt GmbH. Track-readjusted magnetic-tape recorder with transverse tracking. 4,876,614, Cl. 360-10.200.
Kabeya, Motoo: *See*—
Shindou, Yoshio; Kabeya, Motoo; Shimazu, Takashi; and Yamazaki, Fumio, 4,876,160, Cl. 428-623.000.
Kabushiki Kaisha Asahi Kinzoku Kogyosho: *See*—
Kaneko, Toshio, 4,875,353, Cl. 72-133.000.
Kabushiki Kaisha Daikin Seisakusho: *See*—
Fujimoto, Shinji, 4,875,562, Cl. 192-3.280.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Onuki, Toru; Sagawa, Junichi; Watanabe, Tamotsu; and Yoshimitsu, Toshio, 4,876,158, Cl. 428-565.000.
Watanabe, Yuji; and Nakamura, Masahiro, 4,876,729, Cl. 382-22.000.
Kabushiki Kaisha Kyoto Daiichi Kagaku: *See*—
Inoue, Kazushige; Yamamoto, Hiroshi; Hyodo, Hiroshi; and Kishimoto, Shinichi, 4,876,204, Cl. 436-46.000.
Kabushiki Kaisha Nihon M.D.M.: *See*—
Shimazu, Hideaki; Ito, Hiroshi; and Yamakoshi, Kenichi, 4,875,488, Cl. 128-694.000.
Kabushiki Kaisha Polyurethane Engineering: *See*—
Toda, Kenichi; and Hori, Tetsuhiro, 4,876,071, Cl. 422-133.000.
Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Suzuki, Masaru, 4,875,860, Cl. 439-15.000.
Suzuki, Masaru, 4,876,493, Cl. 318-293.000.
Kabushiki Kaisha Toshiba: *See*—
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, 4,876,560, Cl. 346-153.100.
Iida, Toshikatsu; Fujiwara, Takayoshi; and Fukuda, Tetsuo, 4,875,842, Cl. 418-220.000.
Itaya, Keiji; and Kohayakawa, Hiromasa, 4,876,576, Cl. 355-285.000.
Matsutani, Kinya, 4,875,485, Cl. 128-653.000.
McNeill, Kevin M.; and Ozeki, Takeshi, 4,876,643, Cl. 364-200.000.
Morohashi, Katsuei; Shimokobe, Jiro; and Shimoma, Taketoshi, 4,876,478, Cl. 313-413.000.
Mose, Tadao; Andoh, Yasuhiro; and Kitasin, Tatuhisa, 4,876,637, Cl. 363-37.000.
Nishida, Naoto; and Nishio, Mitsuhiro, 4,876,690, Cl. 372-56.000.
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.
Saito, Mitsuo; Matoba, Tsukasa; and Okamoto, Toshio, 4,876,657, Cl. 364-521.000.
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; and Yamazaki, Tatsuo, 4,876,119, Cl. 427-250.000.
Takekado, Shigeru, 4,876,623, Cl. 360-104.000.
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, 4,875,607, Cl. 222-643.000.
Yoda, Takashi; and Watanabe, Tohru, 4,876,223, Cl. 437-228.000.
Yoshioka, Ritsuo; Ueda, Makoto; Motora, Yoichi; and Nakamura, Mitsuharu, 4,876,060, Cl. 376-333.000.
Kabushiki Kaisha Yakult Honsha: *See*—
Ishiwa, Hiromi; Shibahara, Harue; Mutai, Masahiko; and Tsuchida, Nobuo, 4,876,202, Cl. 435-320.000.
Kabushiki Kaishi Toshiba: *See*—
Iwai, Isamu; Okamoto, Toshio; and Doi, Miwako, 4,876,665, Cl. 364-900.000.
Kabushikikaisha Riken: *See*—
Onuki, Toru; Sagawa, Junichi; Watanabe, Tamotsu; and Yoshimitsu, Toshio, 4,876,158, Cl. 428-565.000.
Kaczmarek, Richard, to Reliance Comm/Tec Corporation. Central office protector module with alarm indicator. 4,876,626, Cl. 361-119.000.
Kada, Masumi: *See*—
Nakano, Yoshitomo; and Kada, Masumi, 4,876,324, Cl. 528-142.000.
Kadleck, Richard G.; and Nowak, William W., to Shelby Paper Box Co., The. Carton having a horizontal object holding panel and blank. 4,875,585, Cl. 206-426.000.
Kadotani, Masanori: *See*—
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.
Kaempf, Ulrich: *See*—
Tullis, Barclay J.; Bailey, John S.; Gunawardena, D. R.; and Kaempf, Ulrich, 4,875,825, Cl. 414-786.000.
Kagimasa, Toyohiko: *See*—
Gotou, Shizuo; Kagimasa, Toyohiko; and Yoshizumi, Seiichi, 4,876,646, Cl. 364-200.000.
Kainuma, Masakuni: *See*—
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.
Kaito, Takashi; and Adachi, Tatsuya, to Seiko Instruments Inc. Process for forming metallic patterned film. 4,876,112, Cl. 427-38.000.
Kajimoto, Yoshiaki: *See*—
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased, 4,875,909, Cl. 55-40.000.
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased (by Kiguchi, Kuniko, legal representative), to Nippon Shokubai Kasaku Kogyo Co., Ltd.; and Atochem. Method for recovery of ethylene oxide. 4,875,909, Cl. 55-40.000.
Kalan, Michael D.: *See*—
Bittorf, Bradley J.; Flood, Mark A.; Kalan, Michael D.; and Sepsi, Robert R., 4,876,664, Cl. 364-900.000.
Kalomiris, Vasilios E. Fiber optic connectors. 4,875,753, Cl. 350-96.200.
Kamath, Hundi P.; and Leder, Jeffrey C., to Raychem Corporation. Electrical devices comprising conductive polymer compositions. 4,876,440, Cl. 219-548.000.
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, to Matsushita Electric Works, Ltd. Optical sensor with optical interconnection board. 4,876,446, Cl. 250-221.000.
Kamijo, Eiji: *See*—
Ogata, Kiyoshi; Ando, Yasunori; Kamijo, Eiji; and Matsumura, Noriaki, 4,875,284, Cl. 29-830.000.
Kamimura, Taisuke, to Sharp Kabushiki Kaisha. Developing method using non-magnetic one-component toner and developing unit therefor. 4,876,573, Cl. 355-250.000.
Kampe, Klaus-Dieter: *See*—
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.
Kanai Juyo Hyogo, Kogyo Company Limited: *See*—
Nakano, Yuzuru, 4,875,333, Cl. 57-125.000.
Kanber, Hilda; and Chen, James C., to Hughes Aircraft Company. Method for fabricating varactor diodes using ion implanation. 4,876,211, Cl. 437-22.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Hamakawa, Yoshihiro; Tawada, Yoshihisa; Tsuge, Kazunori; and Izumina, Masanobu, 4,875,943, Cl. 136-244.000.
Kaneko, Rokusaburo: *See*—
Ozawa, Yoshio; Yamamoto, Takashi; Shigaki, Takao; and Kaneko, Rokusaburo, 4,876,568, Cl. 355-56.000.
Kaneko, Toshio, to Kabushiki Kaisha Asahi Kinzoku Kogyosho. Method and apparatus for manufacturing curved pipe. 4,875,353, Cl. 72-133.000.
Kaneko, Toyohisa; and Watanuki, Osaaki, to International Business Machines Corporation. Speech recognition system. 4,876,720, Cl. 381-43.000.
Kanezawa, Nobuyoshi, to Uchiya Termostat Co. Waterproof switch. 4,876,422, Cl. 200-302.100.
Kang, Hyung H., to PPG Industries, Inc. Water-proofing composition. 4,876,152, Cl. 428-447.000.
Kanojia, Ramesh M.: *See*—
Hajos, Zoltan G.; Kanojia, Ramesh M.; and Press, Jeffery B., 4,876,257, Cl. 514-253.000.
Kanshin, Nikolai N.: *See*—
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.
Kao Corporation: *See*—
Hirota, Hajime; Ogino, Hidekazu; Igarashi, Sahoko; and Sotoya, Kohshiro, 4,876,034, Cl. 252-546.000.
Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, 4,876,084, Cl. 424-62.000.
Kaptur, Stephen J. Valve control system for internal combustion engines. 4,875,440, Cl. 123-81.00B.
Karner, Gary M.: *See*—
Taylor, James M.; and Karner, Gary M., 4,875,398, Cl. 83-100.000.
Karton, Ishai: *See*—
Fisher, Abraham; and Karton, Ishai, 4,876,260, Cl. 514-278.000.
Kartridg Pak Co., The: *See*—
Cohrs, Donald E., 4,875,324, Cl. 53-88.000.
Roberts, Gary F.; and Meeker, Rick A., 4,875,601, Cl. 222-145.000.
Karube, Yoshiyuki; Hayakawa, Toshimasa; and Yoshida, Yasunari, to Brother Kogyo Kabushiki Kaisha. Printing device having gear connected multiple feed paths. 4,875,790, Cl. 400-605.000.
Karydas, Athanasios, to Ciba-Geigy Corporation. Use of organic fluorochemical compounds with oleophobic and hydrophobic groups in asphaltenic crude oils as viscosity reducing agents. 4,876,018, Cl. 252-8.551.
Kasai, Toshihiro: *See*—
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, 4,876,560, Cl. 346-153.100.
Kashima, Takayuki; Sakabe, Akira; and Yamanaka, Yoshifumi, to Hitachi Seiko, Ltd. Inverter controlled-type power source for arc welding. 4,876,433, Cl. 219-130.510.
Kasprow, Robert F.: *See*—
Trousdell, Edmund D.; and Kasprow, Robert F., 4,875,830, Cl. 416-215.000.
Kasugai, Heki, to Mitsubishi Jukogyo Kabushiki Kaisha. Rotary jack assembly for a crane. 4,875,415, Cl. 104-35.000.
Katagiri, Kazuharu: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Kobayashi, Toyoko; and Shinjo, Kenji, 4,876,027, Cl. 252-299.650.

Kataoka, Hiroshi, to Kataoka Machine Co., Ltd. Web dividing and rewinding machine and method for removing rewind rolls therefrom. 4,875,632, Cl. 242-56.200.
Kataoka Machine Co., Ltd.: *See*—
Kataoka, Hiroshi, 4,875,632, Cl. 242-56.200.
Katayama, Akihiro: *See*—
Ohsawa, Hidefumi; Katayama, Akihiro; Hosokawa, Hiroshi; Sunohara, Izuru; and Yoshimoto, Masahiko, 4,876,610, Cl. 358-443.000.
Katchalski-Katzir, Ephraim: *See*—
Hollander, Zeev; Salomon, Beka; and Katchalski-Katzir, Ephraim, 4,876,191, Cl. 435-7.000.
Kato, Chuzo; and Kuroda, Kazuyuki, to Osaka Yuki Kagakuo Kogyo Kabushiki Kaisha. Photochromic-electrochromic intercalation compound. 4,875,762, Cl. 350-357.000.
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, to Aisin AW Co. Ltd.; and Toyota Jidosha Kabushiki Kaisha. Accumulator. 4,875,665, Cl. 267-170.000.
Kato, Fumiyasu: *See*—
Mochizuki, Seiji; and Kato, Fumiyasu, 4,875,633, Cl. 242-58.300.
Kato, Kazumi: *See*—
Ishii, Yoh; Abe, Masami; Harada, Yuhzoh; Takasugi, Atsumi; and Kato, Kazumi, 4,875,519, Cl. 164-465.000.
Katoh, Masaie: *See*—
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.
Katori, Tatsuhiko: *See*—
Hasegawa, Hiroshi; Shioiri, Noriaki; Narita, Tadashi; and Katori, Tatsuhiko, 4,876,359, Cl. 548-533.000.
Katsumata, Azusa; and Satomura, Shigeyuki, to Sony Corporation. Apparatus for reproducing a digital signal. 4,876,616, Cl. 360-53.000.
Katsuyama, Yoshiaki: *See*—
Wada, Toshiaki; Katsuyama, Yoshiaki; and Nakaoka, Junichi, 4,875,987, Cl. 204-192.150.
Katz, Ira: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.
Katzin, Leonard: *See*—
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.
Kaukeinen, Joseph Y.: *See*—
Hsu, Kevin; Rao, Srinivas T.; and Kaukeinen, Joseph Y., 4,875,969, Cl. 156-633.000.
Kaushik, Pushpendar K.: *See*—
Singh, Vir B.; Moorthy, Kanniah N. G. K.; Kaushik, Pushpendar K.; and Sankarasub-Ramanian, Hariharan, 4,875,900, Cl. 8-94.270.
Kautt, Jean-Jacques, to Ferco International. Covering element for multilock fitting fastened to a door, window or the like. 4,875,727, Cl. 292-337.000.
Kawabata, Akira; Terasaki, Yoshikazu; Inoue, Takashi; and Takita, Hidenori, to Mitsubishi Denki Kabushiki Kaisha. Deflection yoke for a color cathode ray tube. 4,876,479, Cl. 313-440.000.
Kawada, Mikio: *See*—
Otera, Junzo; Mandai, Tadakatsu; and Kawada, Mikio, 4,876,400, Cl. 568-824.000.
Kawaguchi, Kiyoshi: *See*—
Yamada, Muneki; and Kawaguchi, Kiyoshi, 4,876,052, Cl. 264-148.000.
Kawai, Makoto: *See*—
Yoshikawa, Haruhiko; and Kawai, Makoto, 4,875,450, Cl. 123-425.000.
Kawai, Michio: *See*—
Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, 4,876,084, Cl. 424-62.000.
Kawai, Taneichi; Yasuda, Tomio; and Aoki, Koji, to Aisin Seiki Kabushikikaisha. Harm preventing apparatus for vehicle. 4,876,649, Cl. 364-424.050.
Kawai, Toshikazu: *See*—
Kondo, Takeshi; Kawai, Toshikazu; and Oshio, Hideki, 4,876,404, Cl. 570-145.000.
Nishimura, Yasunobu; and Kawai, Toshikazu, 4,876,382, Cl. 560-109.000.
Kawamoto, Mineo: *See*—
Akahoshi, Haruo; Murakami, Kanji; Kawamoto, Mineo; Tadokoro, Akio; and Yoshimura, Toyofusa, 4,876,177, Cl. 430-313.000.
Kawamura, Kazushige, to Fuji Photo Film Co., Ltd. Image signal processing method and apparatus. 4,876,734, Cl. 382-54.000.
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, to Governor of Gunma-ken; and Nakamuraya Co., Ltd. Process for making meat products containing a konjac mannan gel. 4,876,103, Cl. 426-574.000.
Kawano, Toshihiko: *See*—
Hisanaga, Yorisato; Shimokawa, Kazuhiro; Kawano, Toshihiko; Suita, Yasunori; and Yamashita, Tsuneo, 4,876,245, Cl. 514-29.000.
Kawasaki Jukogyo Kobushiki Kaisha: *See*—
Soga, Katumasa; and Matsutani, Kazuo, 4,875,426, Cl. 114-123.000.
Kawasaki, Ryoji: *See*—
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.
Kawasaki, Yoshinobu: *See*—
Fuse, Genzo; Miwa, Hiroshi; and Kawasaki, Yoshinobu, 4,875,823, Cl. 414-735.000.
Kawasoe, Tatsuro: *See*—
Yamane, Akio; Kawasoe, Tatsuro; Tsukumo, Noriko; and Miyoshi, Kenichi, 4,876,335, Cl. 536-27.000.
Kawata, Ken: *See*—
Ozaki, Hiroyuki; and Kawata, Ken, 4,876,184, Cl. 430-607.000.
Kawato, Humio: *See*—
Mizuno, Shinji; Kawato, Humio; Hanazawa, Kazuyoshi; Aoyama, Tatsuaki; and Ogasawara, Yoshinari, 4,875,911, Cl. 55-162.000.
Kaymar-Parkguard Inc.: *See*—
Hartwig, Klaus, 4,875,797, Cl. 404-9.000.
Kayser, Michael: *See*—
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, 4,876,255, Cl. 514-252.000.
Kazz, Michael. Track shoe with a detachable spike plate by the use of plastic spikes. 4,875,300, Cl. 36-134.000.
Kedzierski, Heinrich: *See*—
Bernhardt, Bruno; and Kedzierski, Heinrich, 4,875,405, Cl. 92-194.000.
Keener, Melvin E.: *See*—
Gardner, Bronson; Keener, Melvin E.; DeSutter, Steven C.; Jagatich, Carl T.; and Felice, Ralph A., 4,876,647, Cl. 364-420.000.
Keller, Werner, to Stopinc Aktiengesellschaft. Refractory valve body and sliding closure unit incorporating the same. 4,875,606, Cl. 222-600.000.
Kellison, Roger C. Seismic anchor. 4,875,808, Cl. 405-244.000.
Kelly, Robert J., to Allied-Signal Inc. Ridge regression signal processing for position-fix navigation systems. 4,876,550, Cl. 342-451.000.
Kelm, Walter H.: *See*—
Haque, Sazzadul; Floyd, Thomas O.; Savas, Nick; and Kelm, Walter H., 4,875,812, Cl. 407-104.000.
Kennametal Inc.: *See*—
Powell, John W.; and Massa, Ted R., 4,875,365, Cl. 73-104.000.
Kennedy, Melvin R.: *See*—
Arad, Avi; and Kennedy, Melvin R., 4,875,675, Cl. 272-74.000.
Kent, George W., Jr. Fish scaling apparatus and process. 4,875,255, Cl. 17-64.000.
Kent, Steven, to Colgate-Palmolive Company. Adjustable toothbrush. 4,875,248, Cl. 15-143.00R.
Kern, Karle O., Jr., to Dana Corporation. Preloaded steering ball joint assembly and method. 4,875,794, Cl. 403-132.000.
Kernforschungszentrum Karlsruhe Gesellschaft mit Beschrankter Haftung: *See*—
Gusten, Hans; Ache, Hans-Joachim; Rinke, Monika; and Wirth, Hermann O., 4,876,029, Cl. 252-301.170.
Penzhorn, Ralf-Dieter; and Yoshida, Hiroshi, 4,875,945, Cl. 376-146.000.
Kerr, Howard T.; Buchanan, Michael E.; and Valentine, Kenneth H., to Martin Marietta Energy Systems, Inc. Method and device for identifying different species of honeybees. 4,876,721, Cl. 358-56.000.
Kesler, John K.; McCown, Robert J.; and Shia, John J., to ENSCO. Inc. Apparatus and method for the field measurement of bearing lubricant and seal integrity testing. 4,875,366, Cl. 73-118.100.
Kewin, Daniel D., to Sonoco Products Company. Non-returnable newsprint carrier system. 4,875,636, Cl. 242-68.600.
Khanna, Yash P.; Bhattacharjee, Himangshu R.; Kumar, Rakesh; Williams, Jon I.; and Sibilia, John P., to Allied-Signal Inc. Method of blow molding polyamides. 4,876,127, Cl. 428-35.700.
Khutoretsky, Garri M.; Tjurin, Jury G.; Varshavsky, Vladimir D.; Zagorodnaya, Galina A.; and Fridman, Vladimir M., to Leningradskoe Proizvodstvennoe Electromachinostroitelnoe Obiedinenie "Electrosila" Imeni S.M. Kirova. Rotor of a cryogenic dynamoelectric machine. 4,876,469, Cl. 310-52.000.
Kiewit, David A., to A. C. Nielsen Company. Method and apparatus for determining channel reception of a receiver. 4,876,736, Cl. 455-2.000.
Kigre, Inc: *See*—
Myers, John D., 4,875,920, Cl. 65-30.140.
Kiguchi, Isamu, deceased: *See*—
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased, 4,875,909, Cl. 55-40.000.
Kiguchi, Kuniko, legal representative: *See*—
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased, 4,875,909, Cl. 55-40.000.
Kihara, Taku, to Sony Corp. Aperture correction circuit. 4,876,599, Cl. 358-162.000.
Kikuchi, Sei: *See*—
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,875,834, Cl. 417-269.000.
Kikukawa, Hiroyasu; Shimoda, Eiji; Sakai, Mari; and Kitada, Fumiko. Process for selectively separating gaseous mixtures containing water vapor. 4,875,908, Cl. 55-16.000.
Killian, Kevin M., to Allied-Signal Inc. Fiber optic accelerometer using closed feedback relation to vary pathlength. 4,876,447, Cl. 250-227.000.
Kim, Du H.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Kim, Hak M.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Kim, Jae S.: *See*—
Dyck, Rudolph H.; and Kim, Jae S., 4,876,586, Cl. 357-30.000.

Kim, Sang H.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Kim, Si M.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Kimmel, David J.: *See*—
Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; and Sotolongo, Thomas J., 4,875,865, Cl. 439-101.000.

Kimura, Norihisa: *See*—
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.

Kimura, Toshiaki: *See*—
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, 4,875,810, Cl. 406-14.000.

Kinast, Robert A.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,876,538, Cl. 340-825.260.

King, David M.; and Padley, Frederick B., to Unilever Patent Holdings BV. Substitute milk fat compositions. 4,876,107, Cl. 426-601.000.

King, Desmond F.: *See*—
Hsieh, C. Richard; King, Desmond F.; Pettersen, Frederick A.; and Shargay, Cathleen A., 4,875,996, Cl. 208-157.000.

King, Edward: *See*—
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,875,773, Cl. 356-328.000.

Kinnebrew, Earl, II; and Palmer, Paul D., Sr., to Rhema Enterprises, Inc. Thread dyeing apparatus and method. 4,875,348, Cl. 68-200.000.

Kinzer, Darryl W.: *See*—
Adams, Paul E.; and Kinzer, Darryl W., 4,876,374, Cl. 558-109.000.

Kioritz Corporation: *See*—
Hirayama, Koji; and Aiyama, Fumihiko, 4,875,384, Cl. 74-500.500.

Kirchheiner, Rolf: *See*—
Rockel, Manfred; Wallis, Ernst; Kohler, Michael; Heubner, Ulrich; and Kirchheiner, Rolf, 4,876,065, Cl. 420-582.000.

Kiriake, Masaharu, to Murata Kikai Kabushiki Kaisha. Tray transfer device. 4,875,572, Cl. 198-744.000.

Kirillov, Jury B.: *See*—
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.

Kirkup, Michael P.; and McCombie, Stuart W., to Schering Corporation. Intermediate compounds for preparing penems and carbapenems. 4,876,365, Cl. 549-215.000.

Kishimoto, Shinichi: *See*—
Inoue, Kazushige; Yamamoto, Hiroshi; Hyodo, Hiroshi; and Kishimoto, Shinichi, 4,876,204, Cl. 436-46.000.

Kissinger, Gaylord M., to General Electric Company. Process for preparation and purification of bisphenols. 4,876,391, Cl. 568-724.000.

Kissinger, Gaylord M., to General Electric Company. Process for color stabilization of bisphenol-A. 4,876,395, Cl. 568-728.000.

Kitada, Fumihiko: *See*—
Okamoto, Kenzo; and Kitada, Fumihiko, 4,875,721, Cl. 292-29.000.

Kitada, Fumiko: *See*—
Kikukawa, Hiroyasu; Shimoda, Eiji; Sakai, Mari; and Kitada, Fumiko, 4,875,908, Cl. 55-16.000.

Kitamoto, Tatsuji; Yokoyama, Katsuya; and Sekiguchi, Takuji, to Fuji Photo Film Co., Ltd.; and Nippon Hoso Kyokai. Method of and system for driving magnetic tape. 4,875,610, Cl. 226-10.000.

Kitamoto, Tatsuji: *See*—
Yamazaki, Nobuo; and Kitamoto, Tatsuji, 4,876,022, Cl. 252-62.560.

Kitasin, Tatuhisa: *See*—
Mose, Tadao; Andoh, Yasuhiro; and Kitasin, Tatuhisa, 4,876,637, Cl. 363-37.000.

Kittaka, Toshihiko; Ando, Akira; and Sakabe, Yukio, to Murata Manufacturing Co., Ltd. Chip type piezoelectric device. 4,876,476, Cl. 310-320.000.

Kiuchi, Takeo; and Sakurai, Hidetoshi, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for controlling the solenoid current of a solenoid valve which controls the amount of suction of air in an internal combustion engine. 4,875,447, Cl. 123-339.000.

Kjosness, David P.; and Marriott, Joe E., to Hewlett-Packard Company. Coaxial switching system with switched shields and crosstalk suppression. 4,876,520, Cl. 333-12.000.

Klaudt, Milton D.: *See*—
Mitchell, Roy O.; Klaudt, Milton D.; and Ullom, Kathleen F. M., 4,876,484, Cl. 315-94.000.

Klaus, Michael; and Weiss, Ekkehard, to Hoffmann-La Roche Inc. Tetrahydronaphthalene and indane derivatives. 4,876,349, Cl. 546-350.000.

Klekamp, Mark S.: *See*—
Feldman, Fred; Klekamp, Mark S.; Hrinda, Michael E.; Shaw, Arthur B.; and Chandra, Sudhish, 4,876,241, Cl. 514-2.000.

Kliem, Erhard; Weber, Guenter; and Kunz, Alfred, to Linde Aktiengesellschaft. Separation of a mixture of sulfur and alkaline solution and apparatus therefor. 4,876,079, Cl. 423-578.00R.

Klimmer, Josef W.: *See*—
Hagerer, Paul; Glaser, Fritz; Klimmer, Josef W.; and Kunze, Reinhard, 4,875,889, Cl. 460-1.000.

Klos, Waltraud: *See*—
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.

Kloucek, Franz; Larsson, Per-Olof; and Vogt, Ernst, to BBC Brown Boveri AG. Apparatus for manufacturing a laminar bond. 4,875,613, Cl. 228-44.300.

Klutchko, Sylvester: *See*—
Hodges, John C.; and Klutchko, Sylvester, 4,876,343, Cl. 544-168.000.

Knifton, John F.; and Grice, Neal J., to Texaco Chemical Company. Method for production of phenol/acetone from cumene hydroperoxide. 4,876,397, Cl. 568-798.000.

Knobloch, Osbert; and Muller, Manfred, to Krupp Polysius AG. Method and apparatus for crushing brittle material for grinding. 4,875,628, Cl. 241-24.000.

Ko, An-Nan: *See*—
Lin, Trong-Goang; Ho, Ling-Wen; Ko, An-Nan; and Perng, Yeong-Ju, 4,876,398, Cl. 568-804.000.

Kobashi, Kiyoshi: *See*—
Hayashi, Kotaro; Ito, Sumio; and Kobashi, Kiyoshi, 4,875,336, Cl. 60-286.000.

Kobatake, Hiroyuki; and Jinbo, Toshikatsu, to NEC Corporation. Control circuit for multipurpose input terminal. 4,876,462, Cl. 307-246.000.

Kobayashi, Akio: *See*—
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.

Kobayashi, Hideto: *See*—
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,875,834, Cl. 417-269.000.

Kobayashi, Sadao; Ishihara, Yuji; Sato, Katsuyuki; and Ijichi, Kouichi, to Seibulite International Kabushiki Kaisha. Double layer pavement marking sheet material. 4,876,141, Cl. 428-217.000.

Kobayashi, Toshio: *See*—
Susa, Kenzo; Takagi, Kazumasa; Kobayashi, Toshio; Takayama, Takanobu; and Ohta, Norio, 4,876,144, Cl. 428-336.000.

Kobayashi, Toyoko: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Kobayashi, Toyoko; and Shinjo, Kenji, 4,876,027, Cl. 252-299.650.

Kobayashi, Yoshikazu: *See*—
Sasa, Takeya; Kobayashi, Yoshikazu; and Makishima, Reichi, 4,875,720, Cl. 285-249.000.

Koch, Friedrich: *See*—
Budde, Klaus; Koch, Friedrich; and Quella, Ferdinand, 4,876,322, Cl. 526-242.000.

Kodachi, Toru; and Usami, Jun, to NGK Insulators, Ltd. Oxygen concentration measuring device. 4,875,990, Cl. 204-408.000.

Koegel, Keith S.: *See*—
Fleak, David S.; Koegel, Keith S.; Long, William B.; Moist, Stanford C., Jr.; and Nauman, Warren D., 4,875,877, Cl. 439-497.000.

Koehnlein, Ernst: *See*—
Schlag, Johannes; Koehnlein, Ernst; Bauer, Peter; Koessler, Ludwig; and Hausz, Alfred F., 4,876,147, Cl. 428-379.000.

Koerner, Charles B., to ITT Corporation. Doppler shift generator apparatus. 4,876,546, Cl. 342-15.000.

Koessler, Ludwig: *See*—
Schlag, Johannes; Koehnlein, Ernst; Bauer, Peter; Koessler, Ludwig; and Hausz, Alfred F., 4,876,147, Cl. 428-379.000.

Koester, Eberhard: *See*—
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.

Kofod, Mogens: *See*—
Rao, Ram A.; Kofod, Mogens; Puchammer, Julius; and Galiotti, George, 4,875,754, Cl. 350-96.200.

Koga, Eizi: *See*—
Nakanishi, Takehisa; Koga, Eizi; and Fukada, Isao, 4,876,372, Cl. 549-529.000.

Kohayakawa, Hiromasa: *See*—
Itaya, Keiji; and Kohayakawa, Hiromasa, 4,876,576, Cl. 355-285.000.

Kohge, Shinichi: *See*—
Morishita, Mitsuharu; Kohge, Shinichi; Hara, Tadayuki; Hata, Yasuaki; and Umemaru, Hisato, 4,875,367, Cl. 73-118.100.

Kohler, Michael: *See*—
Rockel, Manfred; Wallis, Ernst; Kohler, Michael; Heubner, Ulrich; and Kirchheiner, Rolf, 4,876,065, Cl. 420-582.000.

Kohler, Rudolf: *See*—
Leitz, Hermann; Krayer, Erich; and Kohler, Rudolf, 4,875,564, Cl. 192-45.100.

Koike, Eishi; and Yusa, Yasuhiko, to Ozen Corporation. Sound reproducing device for playing a record disc having a plurality of recorded grooves. 4,876,678, Cl. 369-31.000.

Kojima, Fumiyo: *See*—
Nakamura, Yoko; Kojima, Fumiyo; and Yoshino, Hirobumi, 4,876,571, Cl. 355-210.000.

Kojima, Masao: *See*—
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.

Kojima, Tosaku: *See*—
Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, 4,875,618, Cl. 228-179.000.

Kolb, Walter, to Wolf-Gerate GmbH. Battery operated motor drive for small appliances. 4,876,490, Cl. 318-17.000.

Kolodziej, Helmut, to Statomat-Globe Maschienenfabrik GmbH. Unloading method and apparatus for a cable finishing system. 4,875,571, Cl. 198-431.000.

Kolon Industries, Inc.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Kolvites, Albert: *See*—
Welch, Robert J.; Kolvites, Albert; and White, Robert M., 4,875,696, Cl. 280-47.340.

Kondo, Kenshi, to Nihon Den-Netsu Keiki Co., Ltd. Soldering apparatus. 4,876,437, Cl. 219-388.000.

Kondo, Kunio: *See*—
Yamamoto, Takeshi; Kondo, Kunio; Yoshimura, Hiroshi; Wada, Yoshihiro; and Wada, Fusazo, 4,876,139, Cl. 428-200.000.

Kondo, Takeshi; Kawai, Toshikazu; and Oshio, Hideki, to Central Glass Company, Limited. Preparation of dichlorotrifluoromethyltoluenes including novel isomers. 4,876,404, Cl. 570-145.000.

Kondo, Toshiro: *See*—
Tomosada, Kenji; Kondo, Toshiro; Yamamoto, Tadanobu; and Hashino, Hiroshi, 4,875,704, Cl. 280-695.000.

Kondou, Harufusa; and Kuranaga, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Programmable logic array having a changeable logic structure. 4,876,466, Cl. 307-465.000.

Konze, Jorg: *See*—
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.

Kopp, Clinton V.; Roberts, Dennis; Biltoft, Bruce G.; and White, Victor, to Memtec Limited. Hollow fibre filter cartridge and header. 4,876,012, Cl. 210-644.000.

Koppmann, Bardo: *See*—
Mitlmeier, Norbert; and Koppmann, Bardo, 4,876,522, Cl. 335-193.000.

Koran, Matthew H.: *See*—
Frantz, Leo R.; Bauer, Alfred; Koran, Matthew H.; and Becker, Jack, 4.876,416, Cl. 200-11.00R.

Korber: *See*—
Siems, Wolfgang, 4,875,494, Cl. 131-84.100.

Koshizuka, Atuo, to Fujitsu Limited. Transfer circuit for signal lines. 4,876,467, Cl. 307-570.000.

Kosi, Ceasar U., to Westinghouse Electric Corp. Radial seal. 4,875,691, Cl. 277-147.000.

Kosugi, Isao: *See*—
Mori, Kei; and Kosugi, Isao, 4,875,749, Cl. 350-96.180.

Koszyk, Francis J.; Partis, Richard A.; and Mueller, Richard A., to G. D. Searle & Co. Antiviral compounds and use thereof. 4,876,268, Cl. 514-425.000.

Koterazawa, Toshiyuki: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Koury, Daniel N., to Motorola Inc. Process for fabricating complimentary semiconductor devices having pedestal structures. 4,876,212, Cl. 437-34.000.

Kovalenko, Igor L.: *See*—
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.

Koya, Kei, to NEC Corporation. Arithmetic logic system capable of checking carry look-ahead circuit. 4,876,661, Cl. 364-787.000.

Koyama, Toshihide, to Mazda Motor Corporation. Automobile rear suspension structure. 4,875,705, Cl. 280-697.000.

Koyo Seiko Co., Ltd.: *See*—
Nishida, Masahiro, 4,875,261, Cl. 29-116.100.

Kozuki, Susumu: *See*—
Amikura, Takashi; Fujiwara, Akihiro; Toyama, Masamichi; Ueda, Kouichi; and Kozuki, Susumu, 4,876,564, Cl. 354-400.000.

Kraatz, Udo, to Bayer Aktiengesellschaft. Process for the preparation of optically active 2-hydroxyethyl-azole derivatives. 4,876,353, Cl. 548-262.000.

Kramer, David W., to A. O. Smith Corporation. High efficiency submersible chamber water heater. 4,875,465, Cl. 126-391.000.

Kramer, Felix: *See*—
Becker, Anton; and Kramer, Felix, 4,875,382, Cl. 74-84.00R.

Kramer, Karl-Martin; and Dorenkamp, Richard, to Volkswagen AG. Arrangement for prevention of troublesome load change shocks in an internal combustion engine serving to propel a vehicle. 4,875,449, Cl. 123-400.000.

Kramer, Manfred: *See*—
Heger, Werner; Kramer, Manfred; and Schlossarczyk, Heinrich, 4,875,503, Cl. 137-856.000.

Krasnov, Igor: *See*—
Wetch, Stephen B.; Goris, Gregory A.; and Krasnov, Igor, 4,875,529, Cl. 173-163.000.

Krauter, Allan I.; and Vivenzio, Robert L., to Welch Allyn, Inc. Elastomer-ePTFE biopsy channel. 4,875,468, Cl. 128-3.000.

Krayer, Erich: *See*—
Leitz, Hermann; Krayer, Erich; and Kohler, Rudolf, 4,875,564, Cl. 192-45.100.

Kraz, Vladimir: *See*—
Brint, Gary T.; Bungardt, Gabriele; Gedecke, Jerel C.; Harris, Robert L.; and Kraz, Vladimir, 4,876,712, Cl. 379-387.000.

Kreft, Anthony F., III: *See*—
Musser, John H.; Kreft, Anthony F., III; and Bender, Reinhold H. W., 4,876,346, Cl. 546-172.000.

Krenner, Manfred: *See*—
Hagin, Faust; Drewitz, Hans; and Krenner, Manfred, 4,875,557, Cl. 188-79.550.

Krips, Herbert; and Podhorsky, Miroslan, to Balcke-Durr Aktiengesellschaft. Method of securing parts to a hollow member. 4,875,270, Cl. 29-421.100.

Kristof, Miklos: *See*—
Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela, 4,875,809, Cl. 405-263.000.

Kriz, Frantisek: *See*—
Rajsigl, Zdenek; and Kriz, Frantisek, 4,875,334, Cl. 57-406.000.

Krnan, Palo, to Teledyne Industries, Inc. Loudspeaker with acoustic band-pass filter. 4,875,546, Cl. 181-160.000.

Kroeger, Michael K.; Longo, John M.; Steiger, Ronald P.; and Leung, Peter K., to Exxon Production Research Company. Method for rapidly determining the swelling-clay content in shales and shaly sandstone formations by high-frequency dielectric constant measurements. 4,876,512, Cl. 324-376.000.

Krom, Knute R. Combined crayon and coloring book holder. 4,875,707, Cl. 281-30.000.

Krug, John A.: *See*—
Coulborn, John W.; and Krug, John A., 4,875,417, Cl. 105-248.000.

Kruger, Horst: *See*—
Gschwender, Alois; Kruger, Horst; and Schleifer, Bernhard, 4,875,827, Cl. 415-111.000.

Krupp Polysius AG: *See*—
Knobloch, Osbert; and Muller, Manfred, 4,875,628, Cl. 241-24.000.

Kruse, Bernd O.: *See*—
Bosse, Gerhard R.; Lienow, Michael; Spiegel, Bernt; and Kruse, Bernd O., 4,875,652, Cl. 248-311.200.

Kruse, Lawrence I.; Leonard, Thomas B.; and Ross, Stephen T., to SmithKline Beckman Corporation. 1-aralkyl-2-mercaptoimidazolines as DBH inhibitors. 4,876,266, Cl. 514-392.000.

Kruzel, Bryon S.: *See*—
Donnay, James A.; Jensen, Van E., Jr.; and Kruzel, Bryon S., 4,875,895, Cl. 493-117.000.

Kubein-Messenburg, Dietmar; Meyer, Georg; and Bucking, Wolfram. Method for reconstruction of teeth in an upper jaw. 4,875,857, Cl. 433-56.000.

Kubicek, Donald H.: *See*—
Ewert, Warren M.; Kubicek, Donald H.; and Drake, Charles A., 4,876,410, Cl. 585-516.000.

Kubo, Jun, to Nissan Motor Company, Limited. Anti-skid automotive brake control system including wheel deceleration calculation with shorter lag-time and method for performing calculation. 4,876,650, Cl. 364-426.020.

Kubo, Seitoku: *See*—
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.

Kubo, Takahiro: *See*—
Tajima, Hatsuo; Kubo, Takahiro; and Tajika, Hiroshi, 4,876,574, Cl. 355-253.000.

Kubota, Shin'ichi; Miyano, Hideyo; and Adachi, Hiromitsu, to Honda Giken Kogyo Kabushiki Kaisha. Method and system for detecting the level of engine oil of an engine. 4,876,529, Cl. 340-450.300.

Kubotera, Masaaki: *See*—
Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, 4,876,669, Cl. 365-189.010.

Kuehl, Guenter H.: *See*—
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.

Kuenast, Christoph: *See*—
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, 4,876,275, Cl. 514-452.000.

Kuhle, Engelbert: *See*—
Fuhrer, Wolfgand; Kuhle, Engelbert; Adler, Alfons; and Hanssler, Gerd, 4,876,253, Cl. 514-241.000.

Kuhlman Corporation: *See*—
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.

Kuhlman, Thomas E. Welder's mask with breath controlled eye shield. 4,875,235, Cl. 2-8.000.

Kuhlmann, Werner: *See*—
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.

Kuhn, S.A.: *See*—
Aron, Jerome, 4,875,332, Cl. 56-377.000.

Kukes, Simon G.; Miller, Jeffrey T.; and Gutberlet, Louis C., to Amoco Corporation. Two-catalyst hydrocracking process. 4,875,991, Cl. 208-59.000.

Kulik, David B.: *See—*
Schara, Kristen T.; Kulik, David B.; and McIlvaine, Scott E., 4,875,461, Cl. 125-23.00R.

Kumagai, Yuzo, to Bridgestone Corporation. Tire forming method and apparatus. 4,875,959, Cl. 156-123.000.

Kumar, Rakesh: *See—*
Khanna, Yash P.; Bhattacharjee, Himangshu R.; Kumar, Rakesh; Williams, Jon I.; and Sibilia, John P., 4,876,127, Cl. 428-35.700.

Kume, Kiyotaka: *See—*
Takagi, Akira; Oyaizu, Hirotsugu; Takahashi, Nobuatsu; and Kume, Kiyotaka, 4,875,647, Cl. 248-74.300.

Kump, Wilhelm; and Traxler, Peter, to Ciba-Geigy Corporation. Biphenylyl compounds. 4,876,258, Cl. 514-254.000.

Kunert, Heinz, to Saint-Gobain Vitrage. Method and apparatus for installing automobile glazing. 4,876,132, Cl. 428-43.000.

Kunz, Alfred: *See—*
Kliem, Erhard; Weber, Guenter; and Kunz, Alfred, 4,876,079, Cl. 423-578.00R.

Kunz, Peter, to Mettler Instruments AG. Weighing apparatus with improved electromagnetic load compensation. 4,875,534, Cl. 177-212.000.

Kunze, Reinhard: *See—*
Hagerer, Paul; Glaser, Fritz; Klimmer, Josef W.; and Kunze, Reinhard, 4,875,889, Cl. 460-1.000.

Kupferschmidt, Albert: *See—*
Cwirzen, Casimir Z.; and Kupferschmidt, Albert, 4,875,868, Cl. 439-188.000.

Kuppelmaier, Harald: *See—*
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.

Kuraishi, Yoshiaki, to NEC Corporation. Oversampling A/D converter comprising an additional capacitor switched in synchronism with switchin of an input capacitor. 4,876,544, Cl. 341-166.000.

Kuranaga, Hiroshi: *See—*
Kondou, Harufusa; and Kuranaga, Hiroshi, 4,876,466, Cl. 307-465.000.

Kuraray Co., Ltd.: *See—*
Otera, Junzo; Mandai, Tadakatsu; and Kawada, Mikio, 4,876,400, Cl. 568-824.000.

Kurihara, Takashi: *See—*
Uchida, Koh; Kurihara, Takashi; and Miyoshi, Makoto, 4,875,542, Cl. 180-142.000.

Kuroda, Kazuyuki: *See—*
Kato, Chuzo; and Kuroda, Kazuyuki, 4,875,762, Cl. 350-357.000.

Kuroishi, Masayuki: *See—*
Tamagawa, Shigehisa; Kuroishi, Masayuki; and Fuchizawa, Tetsuro, 4,876,170, Cl. 430-138.000.

Kurokawa, Keiko: *See—*
Tsukahara, Hitoshi; Kurokawa, Keiko; Tsukui, Toshimitsu; and Nagai, Toshitake, 4,876,070, Cl. 422-122.000.

Kurokawa, Masayuki, to American Standard Inc. Method of making molded sanitaryware articles with light transmitting panel. 4,875,958, Cl. 156-108.000.

Kurokawa, Satoshi; Tayama, Suehiro; and Sato, Fumio, to Mitsubishi Rayon Company, Ltd. Process for preparing a thermoplastic resin. 4,876,306, Cl. 524-423.000.

Kurtz, Sharon L. Needle disposal device and method for preventing accidental contact with a needle. 4,875,896, Cl. 604-187.000.

Kusakabe, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Silicon wafer for a semiconductor substrate and the method for making the same. 4,876,224, Cl. 437-228.000.

Kusano, Shoji: *See—*
Matsuzawa, Masafumi; Hokari, Hiroshi; Kusano, Shoji; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,875,930, Cl. 71-106.000.

Kushida, Osami; Ninomiya, Hisamitsu; Nezuka, Masakazu; and Ishikawa, Yoshihiko, to Texas Instruments Incorporated. Switch for circuit breaker. 4,876,523, Cl. 337-299.000.

Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, to Aisin-Warner Kabushiki Kaisha. Manual valve in an automatic transmission. 4,875,392, Cl. 74-867.000.

Kuzuno, Katsutoshi: *See—*
Ishizuka, Shigeo; and Kuzuno, Katsutoshi, 4,875,873, Cl. 439-347.000.

Kyburz, Emilio: *See—*
Aschwanden, Werner; Imhof, Rene ; Jakob, Roland; and Kyburz, Emilio, 4,876,340, Cl. 540-461.000.

Kyogoku, Takeshi: *See—*
Mizutani, Futoshi; Kyogoku, Takeshi; Saitoh, Tatsuo; and Endoh, Shigeki, 4,875,918, Cl. 65-3.120.

Kyojin Rope Manufacturing Co., Ltd.: *See—*
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.

Kyoo, Takatsugu, to Tusbakimoto Chain Co. Apparatus for transferring a lithographic plate. 4,875,570, Cl. 198-408.000.

Kyricos, Christopher: *See—*
Steele, Donald F.; Hoagland, Lawrence C.; Kyricos, Christopher; and Tolan, Peter, 4,875,520, Cl. 165-10.000.

La Telemecanique Electrique: *See—*
Fournier, Bernard, 4,876,418, Cl. 200-50.00C.

Laboratories Biotrol: *See—*
Holtermann, Henri, 4,875,899, Cl. 604-333.000.

Lacey, Paul D.; and Martin, Anthony, to De La Rue Systems, Ltd. Monitoring system. 4,875,589, Cl. 209-534.000.

Lacour, Gilles, to L'Enrouleur Electrique Moderne. Magnetic drive coupler with constant torque independent of output slippage. 4,876,471, Cl. 310-105.000.

Laforest, Pierre: *See—*
Gagnon, Pierre; and Laforest, Pierre, 4,875,660, Cl. 254-1.000.

Lagrange, Alain: *See—*
Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, 4,876,381, Cl. 560-56.000.

Lair, Christopher: *See—*
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, 4,875,552, Cl. 187-1.00R.
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, 4,875,553, Cl. 187-1.00R.

Lam, William Y., to Ethyl Petroleum Additives, Inc. Norbornyl dithiocarbamates. 4,876,375, Cl. 558-235.000.

Lamb, James E.: *See—*
Brewer, Terry L.; Hawley, Dan W.; Lamb, James E.; Latham, William J.; and Stichnote, Lynn K., 4,876,165, Cl. 430-7.000.

Lamb, Owen L., to Slide Management Systems, Inc. Method and apparatus for unloading slide projector trays. 4,875,588, Cl. 209-3.300.

Lamb, Peta-Maree: *See—*
Smith, Richard; Lamb, Peta-Maree; Curtiss, Linda K.; and Witztum, Joseph, 4,876,188, Cl. 435-7.000.

Lambe, John: *See—*
Thakoor, Anilkumar P.; Lambe, John; and Moopen, Alexander, 4,876,668, Cl. 365-163.000.

Lambooy, Elbert, to Stichting Instituut Voor Veeteeltkundig Onderzoek "Schoonoord". Process for stunning livestock. 4,875,253, Cl. 17-1.00E.

Lambour, Jean-Michel: *See—*
Guyomard, Daniel; Torrez, Gerald; Lambour, Jean-Michel; and Arriveau, Claude, 4,876,111, Cl. 427-31.000.

Lander, Naphtali: *See—*
Mechoulam, Raphael; Feigenbaum, Jeffery J.; Lander, Naphtali; and Srebnik, Morris, 4,876,276, Cl. 514-454.000.

Landsinger, Edmund E.: *See—*
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.

Lane, Eric: *See—*
Yamaguchi, Tadanori; Patton, Evan; Lane, Eric; and Yu, Simon, 4,876,214, Cl. 437-038.000.

Lane, William A., Sr., to W. A. Lane, Inc. Fluted product cup. 4,875,620, Cl. 229-1.50B.

Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, to L'Oreal. Naphthalene derivatives possessing a retinoid-type action, processes for their preparation, and medicinal and cosmetic compositions containing these derivatives. 4,876,381, Cl. 560-56.000.

Langford, James W., Jr., to Dresser Industries, Inc. Roller drill bit having radial-thrust pilot bushing incorporating anti-galling material. 4,875,532, Cl. 175-371.000.

Langford, Virgil, to Montana Refining Company. Process for treating hydrocarbons containing mercaptans. 4,875,997, Cl. 208-235.000.

Langley, Keith W.; and Washbourn, Jack, to Westinghouse Brake & Signal Holdings Ltd. Tread brake unit. 4,875,559, Cl. 188-203.000.

Langston, Ralph C. Method for pulling multiple runs of fiber optic cable. 4,875,661, Cl. 254-134.3FT.

Lapadakis, Theodore. Paper tape roll control unit. 4,875,634, Cl. 242-67.30R.

Larson, Scott A.; and Johnson, Duane R., to Deere & Company. Shift lever activated parking brake. 4,875,563, Cl. 192-4.00A.

Larsson, Per-Olof: *See—*
Kloucek, Franz; Larsson, Per-Olof; and Vogt, Ernst, 4,875,613, Cl. 228-44.300.

Laser Precision Corporation: *See—*
Gentile, John R., 4,875,772, Cl. 356-73.100.

Latham, William J.: *See—*
Brewer, Terry L.; Hawley, Dan W.; Lamb, James E.; Latham, William J.; and Stichnote, Lynn K., 4,876,165, Cl. 430-7.000.

Latino, Sandra L.: *See—*
Latino, Vincent P.; and Latino, Sandra L., 4,875,526, Cl. 169-24.000.

Latino, Vincent P.; and Latino, Sandra L. Rough terrain, large water volume, track driven firefighting apparatus and method. 4,875,526, Cl. 169-24.000.

Latussek, Hans-Peter: *See—*
Bruen, Johannes; and Latussek, Hans-Peter, 4,875,869, Cl. 439-189.000.

Lau, Cheuk K.: *See—*
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, 4,876,246, Cl. 514-80.000.

Laucht, Horst; and Euskirchen, Jurgen, to Messerschmitt-Bolkow-Blohm GmbH. Optical system for motion compensation of line scanners. 4,876,448, Cl. 250-234.000.

Lavallee, Francois A., to Essex Group, Inc. High temperature magnet wire bond coat polyamide/aldehyde/aromatic alcohol reaction product. 4,876,316, Cl. 525-427.000.

LaVelle, William M.: *See—*
Wolf, Carol L.; LaVelle, William M.; and Clark, Ross C., 4,876,105, Cl. 426-573.000.

Lavin, Mark A., to International Business Machines Corporation. Method for performing morphic transformations on image data in a general purpose computer. 4,876,733, Cl. 382-27.000.

Lawrence, Noel L. W.: *See*—
Ide, Mason G.; Lawrence, Noel L. W.; and Prager, Lee, 4,876,436, Cl. 219-370.000.

Lea Plaza, Carlos, to Codespi Corporation. Device for correcting deformities of the spine. 4,875,471, Cl. 128-69.000.

Leandris, Sergio; and Moly, Jose, to Precision Mecanique Labinal. Apparatus and method of manufacturing electrical cabling systems. 4,875,286, Cl. 29-872.000.

Leatherman, Russel D.: *See*—
McSpadden, John S.; Leatherman, Russel D.; and Young, Harold R., 4,876,653, Cl. 364-479.000.

LeBlanc, Jean-Claude; and Ratton, Serge, to Rhone-Poulenc Specialites Chimiques. Selective chlorination of phenols. 4,876,396, Cl. 568-779.000.

Lechler, Inc.: *See*—
Coulston, John W.; and Huffman, David C., 4,875,627, Cl. 239-466.000.

Leda Logarithmic Electrical Devices for Automation S.r.l.: *See*—
Lodini, Paolo, 4,876,419, Cl. 200-86.00R.
Lodini, Paolo, 4,876,420, Cl. 200-86.00R.

Leder, Jeffrey C.: *See*—
Kamath, Hundi P.; and Leder, Jeffrey C., 4,876,440, Cl. 219-548.000.

Lee, Andrew J.; Sanduja, Mohan L.; Sugathan, Kenneth; Dragnea, Felicia; and Horowitz, Carl, to Ebonite International, Inc. Decorating bowling balls. 4,875,410, Cl. 101-170.000.

Lee, Garrett, to University of California, Regents of. Catheter assembly. 4,875,897, Cl. 604-283.000.

Lee, John: *See*—
Gustafson, Eric K.; Trebino, Rick; and Lee, John, 4,876,208, Cl. 436-531.000.

Lee, Lawrence L. Guided hammer. 4,875,612, Cl. 227-147.000.

Lee, Leonard E., to Mid-Continent Pipe & Supply Company, Inc. Plastic pipe with locking integral end connection. 4,875,714, Cl. 285-86.000.

Lee, Rebecca: *See*—
Borgos, John A.; Bradac, Francis; Haumschild, Daniel J.; Johnson, Timothy; and Lee, Rebecca, 4,875,755, Cl. 350-96.200.

Lee, Ta J.; Hoffman, William F.; and Rooney, Clarence S., to Merck & Co., Inc. Antihypercholesterolemic compounds. 4,876,279, Cl. 514-510.000.

Lee, Ta J.: *See*—
Hoffman, William F.; Lee, Ta J.; Smith, Robert L.; and Rooney, Clarence S., 4,876,366, Cl. 514-570.000.

Lefsky, Brian: *See*—
Ardini, Joseph L.; Lefsky, Brian; and Farr, Barbara J., 4,876,501, Cl. 324-73.00R.

Legon, Fabrice: *See*—
Mabboux, Michel; De Marchi, Jean-Louis; and Legon, Fabrice, 4,875,299, Cl. 36-117.000.

Leiber, Heinz, to Daimler-Benz Aktiengesellschaft. Hydraulic brake booster arrangement with parallel master cylinders and common housing for pivotable rocker. 4,875,338, Cl. 60-550.000.

Leibowitz, Joseph D., to TRW Inc. Method of making multilayer printed circuit board. 4,875,282, Cl. 29-830.000.

Leicht, John L.; and Leitheiser, Jeffrey D., to Motorola Inc. Circuit location sensor for component placement apparatus. 4,876,656, Cl. 364-491.000.

Leising, Maurice B.; Benford, Howard L.; and Holbrook, Gerald L., to Chrysler Motors Corporation. Electronically-controlled, adaptive automatic transmission system. 4,875,391, Cl. 74-866.000.

Leitheiser, Jeffrey D.: *See*—
Leicht, John L.; and Leitheiser, Jeffrey D., 4,876,656, Cl. 364-491.000.

Leitich, Albert J.: *See*—
Levine, Stephen N.; and Leitich, Albert J., 4,876,740, Cl. 455-33.000.

Leitz, Hermann; Krayer, Erich; and Kohler, Rudolf, to Borg-Warner Automotive GmbH. Spray clutch with a double cage. 4,875,564, Cl. 192-45.100.

Leningradskoe Proizvodstvennoe Electromachinostroitelnoe Obiedinenie "Electrosila" Imeni S.M. Kirova: *See*—
Khutoretsky, Garri M.; Tjurin, Jury G.; Varshavsky, Vladimir D.; Zagorodnaya, Galina A.; and Fridman, Vladimir M., 4,876,469, Cl. 310-52.000.

L'Enrouleur Electrique Moderne: *See*—
Lacour, Gilles, 4,876,471, Cl. 310-105.000.

Lents, Rollie T., to Waddell, James A. Breakaway freestanding roadside structure and method for construction thereof. 4,875,622, Cl. 232-39.000.

Lentz, Cornelia V., executrix: *See*—
Lentz, William P., deceased, 4,875,917, Cl. 65-3.110.

Lentz, William P., deceased (by Lentz, Cornelia V., executrix), to Corning Incorporated. Method for making a layered glass article. 4,875,917, Cl. 65-3.110.

Leonard, Thomas B.: *See*—
Kruse, Lawrence I.; Leonard, Thomas B.; and Ross, Stephen T., 4,876,266, Cl. 514-392.000.

Leone, David A.; Buxton, Clifford A.; and Robbins, W. Dale, to Siemens Energy & Automation, Inc. Barrier with a venting scheme for a circuit breaker. 4,876,424, Cl. 200-306.000.

Lepp, Henry P.; and Lepp, Herman P. Convertible grain bin sweep unloader. 4,875,820, Cl. 414-306.000.

Lepp, Herman P.: *See*—
Lepp, Henry P.; and Lepp, Herman P., 4,875,820, Cl. 414-306.000.

Leroy, Maurice: *See*—
Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, 4,876,036, Cl. 252-637.000.

Lesko, Alan J., to Hewlett-Packard Company. Programmable time advance. 4,876,702, Cl. 375-120.000.

Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., to General Electric Company. Electronically commutated motor driven apparatus including an impeller in a housing driven by a stator on the housing. 4,876,492, Cl. 318-254.000.

Leung, Peter K.: *See*—
Kroeger, Michael K.; Longo, John M.; Steiger, Ronald P.; and Leung, Peter K., 4,876,512, Cl. 324-376.000.

Leva, Max. Contact tower and method of assembly. 4,876,037, Cl. 261-113.000.

Levavi, Shmuel. Human powered vehicles and mechanisms particularly useful therein. 4,875,699, Cl. 280-236.000.

Leven, Margret: *See*—
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.

Levine, Robert A.; and Wardlaw, Stephen C. Method for measuring hemoglobin. 4,875,364, Cl. 73-61.10R.

Levine, Stephen N.; and Leitich, Albert J., to Motorola, Inc. Radiotelephone system employing digitized speech/data signalling. 4,876,740, Cl. 455-33.000.

Levius, Dezso K., to American Medical Systems, Inc. Flat coil spring penile prosthesis. 4,875,472, Cl. 128-79.000.

Leyshon, David W.; and Bader, Robert A., to Atlantic Richfield Company. Thin bed cofeed reactors for methane conversion. 4,876,409, Cl. 585-500.000.

Lias, Roger J.: *See*—
Green, Monika J.; and Lias, Roger J., 4,876,205, Cl. 436-66.000.

Libert, James T., to Square D Company. Thyristor driver turn-off circuit. 4,876,468, Cl. 307-643.000.

Liberty Pool Products S.A.: *See*—
Supra, Carl F. W., 4,876,001, Cl. 210-123.000.

Lichac, Gerald J.: *See*—
Van Elderen, Daniel N.; and Lichac, Gerald J., 4,875,459, Cl. 124-49.000.

LieBerman, Robert A.: *See*—
Higbie, Francis A.; LieBerman, Robert A.; and Rose, Ira M., 4,876,384, Cl. 560-224.000.

Lienow, Michael: *See*—
Bosse, Gerhard R.; Lienow, Michael; Spiegel, Bernt; and Kruse, Bernd O., 4,875,652, Cl. 248-311.200.

Liepins, Leila Z.: *See*—
Liepins, Raimond; Jorgensen, Betty S.; and Liepins, Leila Z., 4,876,032, Cl. 252-500.000.

Liepins, Raimond; Jorgensen, Betty S.; and Liepins, Leila Z., to United States of America, Energy. Process for introducing electrical conductivity into high-temperature polymeric materials. 4,876,032, Cl. 252-500.000.

Liggett, Louis: *See*—
McGuire, Michael; DiGiacomo, Ralph; Palmer, Marcia; and Liggett, Louis, 4,876,104, Cl. 426-57.000.

Light, Greta G.: *See*—
Osterhout, Ralph F.; Howard, Paul L.; and Light, Greta G., 4,876,632, Cl. 362-183.000.

Ligi, Joseph J.: *See*—
Piotrowski, Andrzej M.; and Ligi, Joseph J., 4,875,941, Cl. 134-11.000.

Lin, Chin-Chi. Feeder having a speed change mechanism with a graduated threaded-shaft protector. 4,875,512, Cl. 144-246.00E.

Lin, Henry C.: *See*—
Nowak, Deanne M.; and Lin, Henry C., 4,876,387, Cl. 562-493.000.

Lin, Trong-Goang; Ho, Ling-Wen; Ko, An-Nan; and Perng, Yeong-Ju, to China Petrochemical Development Corporation. Preparation of ortho-alkylated phenols in the presence of a catalyst prepared by co-precipitation process. 4,876,398, Cl. 568-804.000.

Lin, Yuh-Chorng. Balls for target games. 4,875,689, Cl. 273-346.000.

Lindberg, Kaj; Steen, Gerry; and Germundson, Elon, to Gotaverken Arendal AB. Node intersection between columns and pontoon members at a tendon-moored platform. 4,875,806, Cl. 405-224.000.

Lindberg, Per L.: *See*—
Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., 4,876,284, Cl. 514-657.000.

Linde Aktiengesellschaft: *See*—
Kliem, Erhard; Weber, Guenter; and Kunz, Alfred, 4,876,079, Cl. 423-578.00R.

Lindenmeier, Karl-Heinz G.; and Flachenecker, Gerhard, to U.S. Philips Corporation. Signal diversity arrangement for mobile reception. 4,876,743, Cl. 455-133.000.

Lindstrom, Bjorn T.: *See*—
Johansson, Jan A.; Jonsson, Jan I.; and Lindstrom, Bjorn T., 4,875,555, Cl. 187-9.00R.

Linebarger, Randolph S., to Rockwell International Corporation. Velocimeter for a printing press web. 4,875,769, Cl. 356-28.000.

L'Institut De L'Amiante: *See*—
Dunnigan, Jacques; and Menard, Hugues, 4,875,910, Cl. 55-74.000.

Lippard, Ernest R., III: *See—*
Moran, Kevin E.; Smith, Michael L.; and Lippard, Ernest R., III, 4,875,780, Cl. 356-446.000.

Litovitz, Theodore A.: *See—*
Barkatt, Aaron, 4,876,232, Cl. 502-417.000.

Little, D. Dawn: *See—*
Luttmer, Joseph D.; and Little, D. Dawn, 4,876,222, Cl. 437-225.000.

Littleton, Donald N.: *See—*
Coller, John H.; and Littleton, Donald N., 4,875,271, Cl. 29-432.000.

Littlewood, Paul A.: *See—*
Graves, Alan F.; Littlewood, Paul A.; and Weiss, Johannes S., 4,876,682, Cl. 370-66.000.

Litton Systems, Inc.: *See—*
Tazartes, Daniel A.; Mark, John G.; and Matthews, Anthony, 4,875,774, Cl. 356-350.000.

Liu, Benjamin Y. H.; and Ramsey, James W., to University of Minnesota, Regents of the. Non-contaminating flow visualization system. 4,875,340, Cl. 62-50.200.

Liu, James J.: *See—*
Vacon, Gary; and Liu, James J., 4,876,742, Cl. 455-66.000.

Liu, Jen-Jui. Method and means for basement construction. 4,875,807, Cl. 405-229.000.

Livingston, Douglas J., to Black & Webster, Inc. Microprocessor welder controller. 4,876,431, Cl. 219-110.000.

Lloyd, Christopher A. Impression printing process for animals and children. 4,875,953, Cl. 156-62.000.

Lloyd, Clarke B. System and method for implementing and administering a mortgage plan. 4,876,648, Cl. 364-408.000.

Lo, Frederick Y.; Nowlin, Thomas E.; and Wu, Margaret M., to Mobil Oil Corporation. Preparation of alpha-olefin polymers of relatively narrow molecular weight distribution. 4,876,321, Cl. 526-129.000.

Lo, Peter Y. K.; and Ziemelis, Maris J., to Dow Corning Corporation. Process for preparing silicone microparticles cured by a Michael addition reaction. 4,876,039, Cl. 264-4.700.

Lockheed Corporation: *See—*
Franco, Maurice, 4,876,547, Cl. 342-160.000.
Rogers, Philip L.; and Rogers, Milton, 4,875,770, Cl. 356-28.500.

Lodini, Paolo, to Leda Logarithmic Electrical Devices for Automation S.r.l. Two-dimensional electric conductor designed to function as an electric switch. 4,876,419, Cl. 200-86.00R.

Lodini, Paolo, to LEDA Logarithmic Electrical Devices for Automation S.r.l. Continuous flexible electric conductor capable of functioning as an electric switch. 4,876,420, Cl. 200-86.00R.

Loewenstein, Lee M.: *See—*
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Abernathy, Joe V.; and Wooldridge, Timothy A., 4,875,989, Cl. 204-298.000.

Logan, John R.; and Wickens, Donald C. Molded vent. 4,875,317, Cl. 52-208.000.

Logsdon, John E.; Loke, Richard A.; Merriam, Jay S.; and Voight, Richard W., to Union Carbide Chemicals and Plastics Company Inc. Improved aldehyde hydrogenation process. 4,876,402, Cl. 568-881.000.

Lohse, Jurgen. Flexible vessel. 4,875,596, Cl. 220-403.000.

Loke, Richard A.: *See—*
Logsdon, John E.; Loke, Richard A.; Merriam, Jay S.; and Voight, Richard W., 4,876,402, Cl. 568-881.000.

Lombardi, Paolo: *See—*
Longo, Antonio; and Lombardi, Paolo, 4,876,045, Cl. 260-397.300.

Londeen, Gilbert E.: *See—*
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, 4,875,552, Cl. 187-1.00R.
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, 4,875,553, Cl. 187-1.00R.

Long, John D.: *See—*
Foley, Daniel M.; Snyder, Michael D.; and Long, John D., 4,875,527, Cl. 172-248.000.

Long, William B.: *See—*
Fleak, David S.; Koegel, Keith S.; Long, William B.; Moist, Stanford C., Jr.; and Nauman, Warren D., 4,875,877, Cl. 439-497.000.

Long, William W., III, to Pangborn Corporation. Disc cleaner. 4,875,309, Cl. 51-419.000.

Longo, Antonio; and Lombardi, Paolo, to Farmitalia Carlo Erba S.r.l. Process for the preparation of methylene derivatives of androsta-1,4-diene-3,17-dione. 4,876,045, Cl. 260-397.300.

Longo, John M.: *See—*
Kroeger, Michael K.; Longo, John M.; Steiger, Ronald P.; and Leung, Peter K., 4,876,512, Cl. 324-376.000.

Lonza Ltd.: *See—*
McGarrity, John; and Tenud, Leander, 4,876,350, Cl. 548-110.000.

Lopez, Alfred R., to Hazeltine Corp. Phased array antenna with couplers in spatial filter arrangement. 4,876,548, Cl. 342-368.000.

Lorah, Dennis P., to Rohm and Haas Company. Grafted core-shell polymer compositions using polyfunctional compounds. 4,876,313, Cl. 525-281.000.

L'Oreal: *See—*
Grollier, Jean F.; and Cotteret, Jean, 4,875,902, Cl. 8-406.000.
Grollier, Jean F.; and Dupuis, Christine, 4,876,083, Cl. 424-47.000.
Grollier, Jean F.; and Fourcadier, Chantal, 4,876,085, Cl. 424-47.000.
Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, 4,876,381, Cl. 560-56.000.

Lorenz, Donald H.: *See—*
Creasy, Walter S.; and Lorenz, Donald H., 4,875,287, Cl. 30-34.010.

Loret, Jean-Francois: *See—*
Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, 4,876,036, Cl. 252-637.000.

Loris, Keith; and Euchner, James, to Nynex Corporation. Neural network model in pattern recognition using probabilistic contextual information. 4,876,731, Cl. 382-40.000.

Lorsbach, Peter. Jump rescue apparatus. 4,875,548, Cl. 182-137.000.

Losev, Alexandr S.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Lovecky, Craig: *See—*
Gelardi, Anthony; Lowry, Alan; and Lovecky, Craig, 4,875,743, Cl. 312-13.000.

Lowe, Barrie M.: *See—*
Casci, John L.; Lowe, Barrie M.; and Lowe, Thomas V., 4,876,412, Cl. 585-640.000.

Lowe, Thomas V.: *See—*
Casci, John L.; Lowe, Barrie M.; and Lowe, Thomas V., 4,876,412, Cl. 585-640.000.

Lowenkron, Steven B.: *See—*
Chen, Lao-Jer; and Lowenkron, Steven B., 4,876,380, Cl. 560-352.000.

Lowenthal, Richard: *See—*
Holton, Robert A.; Juo, Rouh-Rong; and Lowenthal, Richard, 4,876,399, Cl. 568-817.000.

Lowry, Alan: *See—*
Gelardi, Anthony; Lowry, Alan; and Lovecky, Craig, 4,875,743, Cl. 312-13.000.

Lubowitz, Hyman R.; and Sheppard, Clyde H., to Boeing Company, The. Polyamide composition. 4,876,328, Cl. 528-322.000.

Lubrizol Corporation, The: *See—*
Adams, Paul E.; and Kinzer, Darryl W., 4,876,374, Cl. 558-109.000.

Lucero, David J.; Parazzoli, Claudio G.; and Mangir, Metin S., to Hughes Aircraft Company. Integrated laser head and low inductance pulse forming circuit for pulsed gas lasers. 4,876,693, Cl. 372-82.000.

Luchaco, David G.; and Houng, Charles C., to Lutron Electronics Co. Inc. Two wire low voltage dimmer. 4,876,498, Cl. 323-300.000.

Luciw, Paul; Parkes, Deborah L.; and Van Nest, Gary A., to Chiron Corporation. Feline leukemia virus protein vaccines. 4,876,089, Cl. 424-89.000.

Luebbe, Richard J.; and Hopkins, H. Kenneth. Lead inspection system for surface-mounted circuit packages. 4,875,778, Cl. 356-394.000.

Luebbe, Richard J.; and Hopkins, H. Kenneth. Lead inspection system for surface-mounted circuit packages. 4,875,779, Cl. 356-394.000.

Lueck, Arnold: *See—*
MacGregor, Robert J.; MacGregor, Darlene M.; and Lueck, Arnold, 4,876,099, Cl. 426-242.000.

Lulham, Cedric M.; Wofford, George D.; Bradfute, John G.; and Friedrich, Steven G., to W. R. Grace & Co.-Conn. Easy open shrinkable laminate. 4,875,587, Cl. 206-484.000.

Lulich, John F., to R. P. M. Industries. Pre-lubricant oil pressure adapter. 4,875,551, Cl. 184-6.300.

Lum, Kin K.: *See—*
Vanier, Noel R.; and Lum, Kin K., 4,876,236, Cl. 503-227.000.
Vanier, Noel R.; and Lum, Kin K., 4,876,238, Cl. 503-227.000.

Lummus Crest, Inc.: *See—*
Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 4,875,995, Cl. 208-152.000.

Lundy ELectronics & Systems, Inc.: *See—*
Britt, Ronald H., 4,876,730, Cl. 382-37.000.

Lungershausen, Arnold W.: *See—*
Estes, Marvin F.; and Lungershausen, Arnold W., 4,875,756, Cl. 350-96.200.

Lunk, Hans E.: *See—*
Mehan, Ashok K.; and Lunk, Hans E., 4,876,116, Cl. 427-118.000.

Lurssen, Klaus: *See—*
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.

Luscombe, Brian M.: *See—*
Hewett, Richard H.; and Luscombe, Brian M., 4,875,925, Cl. 71-94.000.

Lutron Electronics Co. Inc.: *See—*
Luchaco, David G.; and Houng, Charles C., 4,876,498, Cl. 323-300.000.

Luttmer, Joseph D.; and Little, D. Dawn, to Texas Instrument Incorporated. Semiconductor passivation. 4,876,222, Cl. 437-225.000.

Lyco Manufacturing, Inc.: *See—*
Zittel, David R., 4,875,344, Cl. 62-381.000.

Lyle, Robert L., to North American Philips Corporation. Duty cycle controller for horizontal synchronization signals in a television receiver. 4,876,463, Cl. 307-265.000.

Lynch, Brian: *See—*
Baltzer, Gary L.; Lynch, Brian; and O'Brien, William D., Jr., 4,875,916, Cl. 65-2.000.

M. Gottlieb Assoc.: *See—*
Shiraki, Manabu; and Hirano, Norimitsu, 4,876,472, Cl. 30-198.000.

M. Manufacturing Services, Inc.: *See—*
Mikesell, Jerome J., 4,875,591, Cl. 211-69.100.

Ma, John Y.; and Houston, Albert C., to Capetronic (BSR) Ltd. TVRO receiver system with low-cost video-noise reduction filter. 4,876,739, Cl. 455-266.000.

Mabboux, Michel; De Marchi, Jean-Louis; and Legon, Fabrice, to Salomon S. A. Ski boot. 4,875,299, Cl. 36-117.000.
Mabry, George R.: *See—*
Capello, Richard D.; and Mabry, George R., 4,876,726, Cl. 382-4.000.
MacDonald, Robert C.; and Abrego, Elsa, to Inventio AG. Dynamic selection of elevator call assignment scan direction. 4,875,554, Cl. 187-124.000.
Macedo, Pedro B.: *See—*
Barkatt, Aaron, 4,876,232, Cl. 502-417.000.
MacGregor, Darlene M.: *See—*
MacGregor, Robert J.; MacGregor, Darlene M.; and Lueck, Arnold, 4,876,099, Cl. 426-242.000.
MacGregor, Francis W., to Quad Research, Inc. Surface treating device. 4,875,246, Cl. 15-98.000.
MacGregor, Robert J.; MacGregor, Darlene M.; and Lueck, Arnold, to MacGregor Wild Rice Co. Process for popping wild rice. 4,876,099, Cl. 426-242.000.
MacGregor Wild Rice Co.: *See—*
MacGregor, Robert J.; MacGregor, Darlene M.; and Lueck, Arnold, 4,876,099, Cl. 426-242.000.
Machida, Hironobu: *See—*
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, 4,876,560, Cl. 346-153.100.
Machida, Minoru: *See—*
Miyakawa, Yasuhiro; and Machida, Minoru, 4,875,939, Cl. 123-271.000.
Mack, Arthur R., II; and Sutherland, John W. H., Jr., to Eastman Kodak Company. Compositions for the detection of high levels of hydrogen peroxide. 4,876,207, Cl. 436-135.000.
MacLeod, Richard J.; and Schiedegger, Charles E., to Tapco Products Company, Inc. Plastic building product. 4,875,318, Cl. 52-211.000.
Maeda, Minoru: *See—*
Maemoto, Kazuo; Iwasaki, Masayuki; Maeda, Minoru; and Aotani, Yoshimasa, 4,876,173, Cl. 430-271.000.
Maeda, Tatsuo: *See—*
Chado, Hiroyuki; Maeda, Tatsuo; and Nakano, Mitsusou, 4,875,733, Cl. 296-195.000.
Maeda, Tetsuro; Wada, Fukuaki; Ohoka, Susumu; and Okamoto, Akihiro, to Denki Kagaku Kogyo Kabushiki Kaisha. Plated resin article. 4,876,145, Cl. 428-327.000.
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for coating a substrate with a coating material. 4,875,434, Cl. 118-52.000.
Maekawa, Motoyuki: *See—*
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.
Maemoto, Kazuo; Iwasaki, Masayuki; Maeda, Minoru; and Aotani, Yoshimasa, to Fuji Photo Film Co., Ltd. Photopolymerizable composition on polyethylene terephthalate film support. 4,876,173, Cl. 430-271.000.
Maestri, Giuseppe. Mobile toy. 4,875,887, Cl. 446-314.000.
Mage, Jacques. Method and apparatus for charring material. 4,875,853, Cl. 432-100.000.
Magic Stuff, Inc.: *See—*
Piccirillo, Alessandro, 4,876,142, Cl. 428-224.000.
Magline, Inc.: *See—*
Monroe, George E., 4,875,700, Cl. 280-414.100.
Magna International Inc.: *See—*
Gruber, Herbert, 4,875,724, Cl. 292-216.000.
Thau, Wolfgang, 4,875,726, Cl. 292-337.000.
Magnavox Government and Industrial Electronics Company: *See—*
Richeson, William E.; and Erickson, Frederick L., 4,875,441, Cl. 123-90.130.
Maignan, Jean: *See—*
Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, 4,876,381, Cl. 560-56.000.
Makagami, Tarp; Fukami, Takeshi; and Terauchi, Toshiro, to Sony Corporation. Synchronizing system for digital apparatus. 4,876,719, Cl. 381-1.000.
Maki, Chihiro: *See—*
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.
Makimoto, Mitsuo: *See—*
Endo, Haruyoshi; Misaizu, Kouei; and Makimoto, Mitsuo, 4,876,744, Cl. 455-326.000.
Makino, Masahiro: *See—*
Endo, Katsuo; and Makino, Masahiro, 4,875,641, Cl. 242-199.000.
Makino, Yoshiyuki: *See—*
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, 4,875,607, Cl. 222-643.000.
Makishima, Reichi: *See—*
Sasa, Takeya; Kobayashi, Yoshikazu; and Makishima, Reichi, 4,875,720, Cl. 285-249.000.
Malhotra, Shadi L.: *See—*
Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., 4,876,169, Cl. 430-110.000.
Mallavia, Louis P.: *See—*
Frazier, Marvin E.; Mallavia, Louis P.; Baca, Oswald G.; and Samuel, James E., 4,876,186, Cl. 435-6.000.
Mallo, Paul: *See—*
Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, 4,876,036, Cl. 252-637.000.
Malmberg, Rolf: *See—*
Holm, Sune, deceased; Malmberg, Rolf; and Svensson, Kjell, 4,876,100, Cl. 426-491.000.
Malpass, Dennis B.; Triplett, Kelly B.; and Piotrowski, Andrzej M., to Texas Alkyls, Inc. Organoaluminum coupling agents and filled polymer compositions thereof. 4,876,318, Cl. 525-446.000.
Malpass, Robert L. H.: *See—*
Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Mathews, Brian; and Peters, Michaels S., 4,875,646, Cl. 244-190.000.
Malson, William S., to Water Systems Development Corporation. Method and apparatus for producing ultrapure water. 4,876,014, Cl. 210-668.000.
Mamiya, Toshiharu, to Canon Kabushiki Kaisha. Pump device and an ink jet recording apparatus having the pump device. 4,876,558, Cl. 346-140.00R.
MAN Nutzfahrzeuge GmbH: *See—*
Hagin, Faust; Drewitz, Hans; and Krenner, Manfred, 4,875,557, Cl. 188-79.550.
Mana, Michael L., to Atlantic Richfield Company. Consolidated proppant pack for producing formations. 4,875,525, Cl. 166-280.000.
Mandai, Tadakatsu: *See—*
Otera, Junzo; Mandai, Tadakatsu; and Kawada, Mikio, 4,876,400, Cl. 568-824.000.
Mangir, Metin S.: *See—*
Lucero, David J.; Parazzoli, Claudio G.; and Mangir, Metin S., 4,876,693, Cl. 372-82.000.
Mannesmann AG: *See—*
Gronsfeld, Josef; Jacobi, Hatto; and Baethmann, Hans-Juergen, 4,875,371, Cl. 73-598.000.
Manning, Frank: *See—*
DeWeert, William R.; and Manning, Frank, 4,875,303, Cl. 42-90.000.
Manuel, Mark: *See—*
Compeau, David E.; Manuel, Mark; and Rogers, Lloyd W., Jr., 4,875,723, Cl. 292-201.000.
Manville Corporation: *See—*
Craighead, Jimmy R., 4,875,323, Cl. 53-48.000.
Marcellis, Daniel H.: *See—*
Donahue, Raymond J.; Cleary, Terrance M.; Hauenstein, Frederick M.; and Marcellis, Daniel H., 4,875,517, Cl. 164-34.000.
Maresca, Louis M.: *See—*
Blackmon, Kenneth P.; Clagett, Donald C.; Fox, Daniel W.; Maresca, Louis M.; and Shafer, Sheldon J., 4,876,317, Cl. 525-433.000.
Margerum, Edwin O.; and Strong, Russell W., to Ford New Holland, Inc. Feed plate assembly for axial flow combine. 4,875,890, Cl. 460-68.000.
Marino, Philip F.; and Vandenberg, Donald E., to Eastman Kodak Company. Assembly for correction of distortions of a mirror. 4,875,764, Cl. 350-611.000.
Marius, Hert, to Societe Chimique Des Charbonnages S.A. Liquid mixtures based on ethylene polymers, a process for producing them and a coating or bonding process in which they are used. 4,875,964, Cl. 156-327.000.
Mark, John G.: *See—*
Tazartes, Daniel A.; Mark, John G.; and Matthews, Anthony, 4,875,774, Cl. 356-350.000.
Marken, Robert E. Swivel connector for preventing kinking of flexible medical hoses. 4,875,718, Cl. 285-175.000.
Marks, George R. Woven-wire gate lock. 4,875,725, Cl. 292-244.000.
Markussen, Erik K., to Novo Industri A/S. Method for production of an enzyme granulate. 4,876,198, Cl. 435-183.000.
Marley Company, The: *See—*
Hill, Wayne E.; and McEachern, Dennis, 4,876,530, Cl. 340-605.000.
Marocco, Norbert. Venetian blind control. 4,875,516, Cl. 160-178.100.
Marrett, Kenneth E., Sr.: *See—*
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.
Marriott, Joe E.: *See—*
Kjosness, David P.; and Marriott, Joe E., 4,876,520, Cl. 333-12.000.
Marsh, Stephan: *See—*
Marsh, Stephen A.; and Young, Robert W., 4,875,358, Cl. 73-40.000.
Marsh, Stephen A.; and Young, Robert W., to Marsh, Stephan. Preparation of condoms by the user. 4,875,358, Cl. 73-40.000.
Marshall, Garland R.; and Moore, Michael L., to Smithkline Beckman Corporation. Vasopressin compounds. 4,876,243, Cl. 514-11.000.
Marshall, John D.; and Mclain, Thomas N., to Schlumberger Industries, Inc. Reverse osmosis water purificaiton unit. 4,876,002, Cl. 210-136.000.
Martin, Anthony: *See—*
Lacey, Paul D.; and Martin, Anthony, 4,875,589, Cl. 209-534.000.
Martin, Gregory G.; and Nook, Thomas J., to Harbor Industries. Foldable display. 4,875,590, Cl. 211-55.000.
Martin Marietta Energy Systems, Inc.: *See—*
Kerr, Howard T.; Buchanan, Michael E.; and Valentine, Kenneth H., 4,876,721, Cl. 358-56.000.
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., to Kuhlman Corporation. Formed metal core blocking method. 4,875,277, Cl. 29-606.000.

Martin, William C.; and Rohrer, Gene D., to International Business Machines Corporation. Method and apparatus for character recognition systems. 4,876,735, Cl. 382-57.000.

Maruyama Mfg. Co. Inc.: *See—*
Tojo, Nobuo, 4,875,690, Cl. 277-12.000.

Marzullo, Joseph H., to Pitney Bowes Inc. Apparatus for folding and sealing documents. 4,875,965, Cl. 156-442.100.

Mase, Akira: *See—*
Yamazaki, Shunpei; and Mase, Akira, 4,875,378, Cl. 73-862.040.

Masheff, Michael S., to E-Systems, Inc. Discrete fourier transform direction finding apparatus. 4,876,549, Cl. 342-417.000.

Mashkovsky, Mikhail D.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Massa, Ted R.: *See—*
Powell, John W.; and Massa, Ted R., 4,875,365, Cl. 73-104.000.

Masuda, Etsuro: *See—*
Yabe, Akira; Ouchi, Akihiko; Moriyama, Hiroshi; and Masuda, Etsuro, 4,875,986, Cl. 204-157.600.

Masuda, Shigeo; and Hosoya, Toshifumi, to Sumitomo Electric Industries, Ltd. Plastic-coated optical transmission fiber and an estimating method thereof. 4,875,758, Cl. 350-96.300.

Matai, Masahiro; and Tsunoda, Kazuyuki, to NEC Corporation. Paging receiver with a light emitting element flashing circuit. 4,876,536, Cl. 340-825.440.

Matoba, Tsukasa: *See—*
Saito, Mitsuo; Matoba, Tsukasa; and Okamoto, Toshio, 4,876,657, Cl. 364-521.000.

Matsuda, Shuichi: *See—*
Watakabe, Yaichiro; Okamoto, Tatsuo; and Matsuda, Shuichi, 4,876,164, Cl. 430-5.000.

Matsumoto, Akira: *See—*
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.

Matsumoto, Makaoto: *See—*
Funahashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Matsumoto, Makaoto, 4,876,363, Cl. 549-215.000.

Matsumoto, Yasuo; Murakami, Kazunori; Ikumi, Tomonori; and Iwafune, Yasuo, to Tokyo Electric Co., Ltd. Polygon mirror. 4,875,748, Cl. 350-6.800.

Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, to Canon Kabushiki Kaisha. Aluminum support for a photoconductive member. 4,876,185, Cl. 430-580.000.

Matsumura, Hideki: *See—*
Okuda, Akihiko; Totake, Yukinori; and Matsumura, Hideki, 4,876,407, Cl. 570-239.000.

Matsumura, Noriaki: *See—*
Ogata, Kiyoshi; Ando, Yasunori; Kamijo, Eiji; and Matsumura, Noriaki, 4,875,284, Cl. 29-830.000.

Matsuo, Katsuharu: *See—*
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, 4,875,607, Cl. 222-643.000.

Matsuoka, Katsumi: *See—*
Saeki, Keiso; Sano, Shojiro; Matsuoka, Katsumi; Takashima, Masanobu; and Iwakura, Ken, 4,876,233, Cl. 503-209.000.

Matsushita Elec. Industries Co. Ltd.: *See—*
Murakami, Mutsuaki, 4,876,077, Cl. 423-448.000.

Matsushita Electric Industral Co., Ltd.: *See—*
Mihara, Makoto; Inoue, Masanobu; Ohji, Kenzo; and Itou, Shuji, 4,875,533, Cl. 177-144.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Endo, Haruyoshi; Misaizu, Kouei; and Makimoto, Mitsuo, 4,876,744, Cl. 455-326.000.
Hatada, Kenzo, 4,876,221, Cl. 437-212.000.
Mukai, Toshiharu, 4,876,679, Cl. 369-44.000.
Ogawa, Kazufumi, 4,875,759, Cl. 350-96.340.

Matsushita Electric Works, Ltd.: *See—*
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,876,446, Cl. 250-221.000.

Matsutani, Kazuo: *See—*
Soga, Katumasa; and Matsutani, Kazuo, 4,875,426, Cl. 114-123.000.

Matsutani, Kinya, to Kabushiki Kaisha Toshiba. Magnetic resonance system. 4,875,485, Cl. 128-653.000.

Matsuura, Hiromichi: *See—*
Yoshida, Susumu; Nakagawa, Shizutoshi; Ushiroguchi, Tsuyoshi; Matsuura, Hiromichi; and Yazaki, Akira, 4,876,281, Cl. 514-517.000.

Matsuzawa, Masafumi; Hokari, Hiroshi; Kusano, Shoji; Miyazawa, Takeshige; and Toyokawa, Yasufumi. Cyclohexane derivatives having plant growth regulating activities and applications thereof. 4,875,930, Cl. 71-106.000.

Mattei, Riccardo; and Ghini, Franco, to G. D. Societa' Per Azioni. Device for feeding streams of tobacco on to a cigarette manufacturing machine. 4,875,493, Cl. 131-84.100.

Matthews, Anthony: *See—*
Tazartes, Daniel A.; Mark, John G.; and Matthews, Anthony, 4,875,774, Cl. 356-350.000.

Matthews, Brian: *See—*
Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Matthews, Brian; and Peters, Michaels S., 4,875,646, Cl. 244-190.000.

Matthews, Robert T.: *See—*
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Abernathy, Joe V.; and Wooldridge, Timothy A., 4,875,989, Cl. 204-298.000.

Matsuyama, Moritake: *See—*
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.

Mauleon, Jean-Louis; Sigaud, Jean-Bernard; Chapotel, Bernard; and Seglin, Leonard, to Compagnie de Raffinage et de Distribution Total France. Process and apparatus for the catalytic cracking of hydrocarbon charges. 4,875,993, Cl. 208-113.000.

Maurer, Albrecht; and Fabian, Josef, to Nukem GmbH. Method and apparatus for detecting faults in an object. 4,876,727, Cl. 382-8.000.

Maurer, Bernie J.: *See—*
Welch, Glenn S.; Fidrych, Stephen; Romm, Michael; and Maurer, Bernie J., 4,875,880, Cl. 439-536.000.

Mavretish, Robert S.: *See—*
Bauer, Frank I.; Mavretish, Robert S.; Shogan, Regis P.; and Sejvar, James, 4,876,593, Cl. 358-100.000.

May & Baker Limited: *See—*
Hewett, Richard H.; and Luscombe, Brian M., 4,875,925, Cl. 71-94.000.

May, David C., to Minnesota Mining and Manufacturing Company. Retroreflective pavement marker. 4,875,798, Cl. 404-12.000.

Mayer, David W.; Gilman, Byron L.; Walgren, Susan M.; and Berglund, June M., to Caridac Pacemakers, Inc. Soluble covering for cardiac pacing electrode. 4,876,109, Cl. 427-2.000.

Mazany, Anthony M., to B. F. Goodrich Company, The. Oxidation resistant compositions for use with rare earth magnets. 4,876,305, Cl. 524-401.000.

Mazda Motor Corporation: *See—*
Chado, Hiroyuki; Maeda, Tatsuo; and Nakano, Mitsusou, 4,875,733, Cl. 296-195.000.
Fujioka, Toyohiko; and Takeshima, Hideki, 4,875,280, Cl. 29-783.000.
Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, 4,875,455, Cl. 123-568.000.
Hiketa, Manabu, 4,875,978, Cl. 180-248.000.
Koyama, Toshihide, 4,875,705, Cl. 280-697.000.
Okimoto, Haruo; and Tashima, Seiji, 4,875,454, Cl. 123-559.300.
Sueda, Yutaka, 4,875,892, Cl. 474-17.000.
Tomosada, Kenji; Kondo, Toshiro; Yamamoto, Tadanobu; and Hashino, Hiroshi, 4,875,704, Cl. 280-695.000.

Mazda Motor Manufacturing (USA) Corporation: *See—*
Fujii, Hiroshi, 4,875,955, Cl. 156-64.000.

McBee, Steve H.: *See—*
Deutsch, Timothy A.; Schreiner, Joel M.; and McBee, Steve H., 4,875,330, Cl. 56-41.000.

McCain Manufacturing Corporation: *See—*
McCain, William B.; and Higgins, George D., 4,875,669, Cl. 270-54.000.

McCain, William B.; and Higgins, George D., to McCain Manufacturing Corporation. Signature gathering machines. 4,875,669, Cl. 270-54.000.

McCarthy, Cornelius: *See—*
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,875,773, Cl. 356-328.000.

McCollum, John L.: *See—*
Mohsen, Amr M.; Hamdy, Esmat Z.; and McCollum, John L., 4,876,220, Cl. 437-170.000.

McCombie, Stuart W.: *See—*
Kirkup, Michael P.; and McCombie, Stuart W., 4,876,365, Cl. 549-215.000.

McCombs, Daniel G.: *See—*
Boardman, Peter W.; and McCombs, Daniel G., 4,875,356, Cl. 72-321.000.

McCord, Donald G. Display interface system using buffered VDRAMs and plural shift registers for data rate control between data source and display. 4,876,663, Cl. 364-900.000.

McCowan, Douglas W., to Mobil Oil Corporation. Display of common depth point seismic data with velocity correction in real time. 4,876,673, Cl. 367-68.000.

McCown, Robert J.: *See—*
Kesler, John K.; McCown, Robert J.; and Shia, John J., 4,875,366, Cl. 73-118.100.

McCray, Scott B., to Bend Research, Inc. Tetrakis-amido high flux membranes. 4,876,009, Cl. 210-500.330.

McCulloch, Beth, to UOP. Process for separating dichlorodiphenylsulfone isomers. 4,876,390, Cl. 568-34.000.

McDonnell Douglas Corporation: *See—*
Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., 4,875,775, Cl. 356-350.000.

McEachern, Dennis: *See—*
Hill, Wayne E.; and McEachern, Dennis, 4,876,530, Cl. 340-605.000.

McElroy James F., to United Technologies Corporation. Fuel cell with integral conduit means for statically removing liquid product water. 4,876,162, Cl. 429-13.000.

McFarlane, Ronald L.: *See—*
Gibson, Paul N., 4,875,292, Cl. 33-304.000.

McGarrity, John; and Tenud, Leander, to Lonza Ltd. Process for the production of (+) biotin. 4,876,350, Cl. 548-110.000.

McGee, Frank C. Beverage maker for use in automotive vehicles. 4,875,408, Cl. 99-283.000.

McGrady, Joseph: *See—*
Feeney, Robert D.; Prosise, Robert L.; McGrady, Joseph; and Niehoff, Raymond L., 4,876,102, Cl. 426-550.000.

McGuckin, Hugh G.: *See—*
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.
Wake, Ronald W.; Reithel, Sibylle L.; and McGuckin, Hugh G., 4,876,166, Cl. 430-7.000.

McGuire, Michael; DiGiacomo, Ralph; Palmer, Marcia; and Liggett, Louis, to General Foods Corporation. Method for preparing and preserving fresh pasta. 4,876,104, Cl. 426-57.000.

McIlvaine, Scott E.: *See—*
Schara, Kristen T.; Kulik, David B.; and McIlvaine, Scott E., 4,875,461, Cl. 125-23.00R.

McIntosh, Blair. Floor mat with disposable absorbent pad. 4,876,135, Cl. 428-74.000.

McIntosh, Harold A., to Robertshaw Controls Company. Method of making an electrical switch. 4,875,278, Cl. 29-622.000.

McKibben, Kenneth D., to CMI International, Inc. Method and apparatus for reclaiming used hydraulic fluid. 4,876,015, Cl. 210-695.000.

Mclain, Thomas N.: *See—*
Marshall, John D.; and Mclain, Thomas N., 4,876,002, Cl. 210-136.000.

McMaster, Richard L., to Nvtek Security Products, Inc. Intrusion detection device with extended field of view. 4,876,445, Cl. 250-221.000.

McNair, Will L.: *See—*
Frink, Tommy S.; Reed, Lowell M.; Cochran, Dwayne V.; and McNair, Will L., 4,875,530, Cl. 175-27.000.

McNeill, Kevin M.; and Ozeki, Takeshi, to Kabushiki Kaisha Toshiba. Parallel searching system having a master processor for controlling plural slave processors for independently processing respective search requests. 4,876,643, Cl. 364-200.000.

McSpadden, John S.; Leatherman, Russel D.; and Young, Harold R. Programmable multiple blender. 4,876,653, Cl. 364-479.000.

Mead, Carver A.; and Allen, Timothy P., to Synaptics Incorporated. Scanning method and apparatus for current signals having large dynamic range. 4,876,534, Cl. 340-825.950.

Mead Corporation, The: *See—*
Chaussadas, Jean, 4,875,586, Cl. 206-427.000.
Hillenbrand, Gary F., 4,876,172, Cl. 430-253.000.

Mechoulam, Raphael; Feigenbaum, Jeffery J.; Lander, Naphtali; and Srebnik, Morris, to Yissum Research Development Co. of The Hebrew University of Jerusalem. (3S-4S)-7-hydroxy-Δ^6-tetrahydrocannabinols. 4,876,276, Cl. 514-454.000.

Medinvent S.A.: *See—*
Imbert, Christian, 4,875,480, Cl. 128-343.000.

Medisense, Inc.: *See—*
Green, Monika J.; and Lias, Roger J., 4,876,205, Cl. 436-66.000.

Meeker, Rick A.: *See—*
Roberts, Gary F.; and Meeker, Rick A., 4,875,601, Cl. 222-145.000.

Megamation Incoporated: *See—*
Hutchinson, James; Hoffman, Brian; and Pollack, Steven, 4,875,275, Cl. 29-568.000.

Mehan, Ashok K.; and Lunk, Hans E., to Raychem Corporation. Metal conductors with improved solderability. 4,876,116, Cl. 427-118.000.

Mehlert, Martin: *See—*
Berkhan, Dietmar; and Mehlert, Martin, 4,875,558, Cl. 188-171.000.

Meierhofer, Beat: *See—*
Gacsay, Lorant; and Meierhofer, Beat, 4,875,506, Cl. 139-450.000.

Meiogenics, Inc.: *See—*
Duck, Peter; Bender, Robert; Crosby, William; and Robertson, John G., 4,876,187, Cl. 435-6.000.

Meisenburg, Gary L., to Brunswick Corporation. Marine propulsion device with thru-transom engine oil drain system. 4,875,884, Cl. 440-88.000.

Meister, Bernard J.; Dryzga, Craig D.; and Tien, Li C., to Dow Chemical Company, The. Process for preparing rubber-modified styrenic polymer compositions containing hydroperoxide derivatives of rubbery polymers. 4,876,312, Cl. 525-263.000.

Meixner, Otto: *See—*
Salzbrunn, Wolfgang; Steiner, Eva; Wohrer, Wilfried; and Meixner, Otto, 4,876,196, Cl. 435-161.000.

Melby, Earl G.; and Cocain, H. William, to GenCorp Inc. Polyurethane adhesive for a surface treatment-free fiber reinforced plastic. 4,876,308, Cl. 524-780.000.

Membrex Incorporated: *See—*
Shmidt, Iosif; and Badiali, Mario, 4,876,013, Cl. 210-650.000.

Memmi, Massimo: *See—*
Alota, Santa; Ferrari, Vincenzo; Memmi, Massimo; Pacelli, Leonardo; and Ramundo, Susanna, 4,875,983, Cl. 204-28.000.

Memrysafe, Inc.: *See—*
Garris, Charles A., 4,875,623, Cl. 236-12.120.

Memtec Limited: *See—*
Kopp, Clinton V.; Roberts, Dennis; Biltoft, Bruce G.; and White, Victor, 4,876,012, Cl. 210-644.000.

Menard, Hugues: *See—*
Dunnigan, Jacques; and Menard, Hugues, 4,875,910, Cl. 55-74.000.

Mendelson, Stuart E.: *See—*
Palanisamy, Thirumalai G.; and Mendelson, Stuart E., 4,876,495, Cl. 320-18.000.

Mensch, William D., Jr. Method and circuitry for causing sixteen bit microprocessor to execute eight bit op codes to produce either internal sixteen bit operation or internal eight bit operation in accordance with an emulation bit. 4,876,639, Cl. 364-200.000.

Mercado, Hector P., to Ameron, Inc. Abrasive threaded fiberglass pipe joint. 4,875,710, Cl. 285-24.000.

Merck & Co., Inc.: *See—*
Applebaum, Joy D.; Bayne, Marvin L.; and Cascieri, Margaret A., 4,876,242, Cl. 514-3.000.
Coss, Malcolm M.; and Tolman, Richard L., 4,876,256, Cl. 514-252.000.
Hartman, George D.; and Prugh, John D., 4,876,271, Cl. 514-443.000.
Hoffman, William F.; Lee, Ta J.; Smith, Robert L.; and Rooney, Clarence S., 4,876,366, Cl. 514-570.000.
Lee, Ta J.; Hoffman, William F.; and Rooney, Clarence S., 4,876,279, Cl. 514-510.000.
Schuda, Ann D.; Verhoeven, Thomas R.; and Shinkai, Ichiro, 4,876,364, Cl. 549-214.000.
Wolf, Carol L.; LaVelle, William M.; and Clark, Ross C., 4,876,105, Cl. 426-573.000.

Merck Frosst Canada, Inc.: *See—*
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, 4,876,246, Cl. 514-80.000.

Merger, Franz: *See—*
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, 4,876,275, Cl. 514-452.000.

Merrett, Ronald G.; and Eakin, Oscar, Jr., to Intermodal Container Systems. Apparatus and method for transporting and unloading containers. 4,875,811, Cl. 406-39.000.

Merriam, Jay S.: *See—*
Logsdon, John E.; Loke, Richard A.; Merriam, Jay S.; and Voight, Richard W., 4,876,402, Cl. 568-881.000.

Mertz, William J.; and Braun, Robert J., to National Distillers and Chemical Corp. Polyvinyl chloride compositions plasticized with copolyesters. 4,876,304, Cl. 524-314.000.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Laucht, Horst; and Euskirchen, Jurgen, 4,876,448, Cl. 250-234.000.
Nathrath, Norbert; and Fasold, Dietmar, 4,876,553, Cl. 343-756.000.

Messner, Kirsten L.; Abrahms, Robert M.; and Beitelia, Ray R., to Advanced Cardiovascular Systems, Inc. Extendable guidewire. 4,875,489, Cl. 128-772.000.

Metcalfe, Christopher I.: *See—*
DeSaro, Robert; Doyle, Edward F.; Metcalfe, Christopher I.; and Patch, Keith D., 4,875,919, Cl. 65-27.000.

Mettler Instruments AG: *See—*
Kunz, Peter, 4,875,534, Cl. 177-212.000.

Metz, Josef, to Rheinmetall GmbH. Recoil brake for a gun having a heat equalization and indication device. 4,875,402, Cl. 89-43.010.

Metzger, Edward C. R.: *See—*
Denny, David S.; Metzger, Edward C. R.; Rexroad, John; and Glynn, William, 4,875,549, Cl. 182-138.000.

Meuter, Herbert: *See—*
Rohs, Ulrich; and Meuter, Herbert, 4,875,379, Cl. 73-862.340.

Mevissen, Peter: *See—*
van Wersch, Kurt; Freiberg, Helge; and Mevissen, Peter, 4,875,942, Cl. 134-15.000.

Meyer, Dieter, to Paper Converting Machine GmbH. Packaging machine for multi-sheet compressible paper products, such as paper towels, toliet paper rolls and the like. 4,875,328, Cl. 53-529.000.

Meyer Flooring Inc.: *See—*
Meyer, Robert R., 4,875,878, Cl. 439-501.000.

Meyer, Georg: *See—*
Kubein-Messenburg, Dietmar; Meyer, Georg; and Bucking, Wolfram, 4,875,857, Cl. 433-56.000.

Meyer, Louis W.; Vanderhider, James A.; and Carswell, Robert, to Dow Chemical Company, The. Internal mold release compositions. 4,876,019, Cl. 252-32.500.

Meyer, Robert R., to Meyer Flooring Inc. Extension cord/tool carrier. 4,875,878, Cl. 439-501.000.

Meyer, Willy: *See—*
Schurter, Rolf; Meyer, Willy; and Fory, Werner, 4,875,923, Cl. 71-92.000.

Meyers, Leo J., to Sun Room Designs, Inc. Beam construction. 4,875,311, Cl. 52-90.000.

Miale, Joseph N.: *See—*
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.

Michaels, Francis J.: *See—*
Wellman, Edward F.; and Michaels, Francis J., 4,875,683, Cl. 273-187.00B.

Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., to McDonnell Douglas Corporation. Reciprocally switched four modulator system. 4,875,775, Cl. 356-350.000.

Michalak, Dennis J.: *See—*
Holzhauer, Juergen K.; Michalak, Dennis J.; and Schammel, Wayne P., 4,876,386, Cl. 562-414.000.

Microdyne Corporation: *See—*
Woodworth, Donald J.; Ziegler, Frank A.; and Grabenstein, James B., 4,876,737, Cl. 455-12.000.

Microvol Limited: *See—*
Weston, Terence E., 4,875,605, Cl. 222-402.240.

Mid-Continent Pipe & Supply Company, Inc.: *See—*
Lee, Leonard E., 4,875,714, Cl. 285-86.000.

Midwest Instrument Co., Inc.: *See—*
Boron, Joseph J., 4,875,380, Cl. 73-864.580.

Midwest Research Institute: *See—*
Engel, James F.; Byerley, Thomas J.; and Christie, Howard W., 4,876,323, Cl. 526-310.000.

Mieno, Fumitake: *See—*
Eshita, Takashi; Mieno, Fumitake; Furumura, Yuji; and Watanabe, Takuya, 4,876,219, Cl. 437-126.000.

Mihara, Makoto; Inoue, Masanobu; Ohji, Kenzo; and Itou, Shuji, to Matsushita Electric Industrial Co., Ltd. Automatic weight detecting device. 4,875,533, Cl. 177-144.000.

Mikesell, Jerome J., to M. Manufacturing Services, Inc. Marking board implement holder. 4,875,591, Cl. 211-69.100.

Mikhail, Ameer G. Postal stamp process, apparatus, and metering device, therefor. 4,876,000, Cl. 209-584.000.

Miller, Alan L.: *See—*
Schneider, Karl F.; Haley, William J.; and Miller, Alan L., 4,875,561, Cl. 192-0.033.

Miller, Allen D.: *See—*
Buhler, James E.; Crapser, James R.; Miller, Allen D.; and Wefler, Mark E., 4,875,626, Cl. 239-314.000.

Miller, Anthony D. Chair construction. 4,875,732, Cl. 297-181.000.

Miller, Arden O., to Navistar International Transportation Corp. Variable wheelbase length steering linkage. 4,875,697, Cl. 280-95.100.

Miller, Bruce E.: *See—*
Owen, Robert E.; and Miller, Bruce E., 4,876,660, Cl. 364-754.000.

Miller, Cecelia B., executrix: *See—*
Miller, Theodore H., deceased; and Slusarski, Ronald S., 4,875,722, Cl. 292-92.000.

Miller, J. Stanley; and Bowles, Thomas J., to Olin Corporation. Method and composition for controlled thickening of thermosetting resins using microencapsulated thickeners. 4,876,296, Cl. 523-200.000.

Miller, Jeffrey T.: *See—*
Kukes, Simon G.; Miller, Jeffrey T.; and Gutberlet, Louis C., 4,875,991, Cl. 208-59.000.

Miller, Richard; and Zlupko, John E., to General Electric Company. Asbestos-free arc-confining insulating structure. 4,876,421, Cl. 200-144.00C.

Miller, Theodore H., deceased (by Miller, Cecelia B., executrix); and Slusarski, Ronald S., to Emhart Industries, Inc. Exit device actuator and dogger. 4,875,722, Cl. 292-92.000.

Milley, Gyula: *See—*
Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela, 4,875,809, Cl. 405-263.000.

Milliren, Charles M., to Mobay Corporation. Isocyanate reactive mixture and the use thereof in the manufacture of flexible polyurethane foams. 4,876,292, Cl. 521-159.000.

Milton Roy Company: *See—*
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,875,773, Cl. 356-328.000.

Minami, Norio: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Minato, Osamu: *See—*
Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, 4,876,669, Cl. 365-189.010.

Mineral Recovery Corporation: *See—*
Haight, William J., 4,875,999, Cl. 209-245.000.

Miniaci, Francesco: *See—*
Vriesema, Bindert K.; and Miniaci, Francesco, 4,876,327, Cl. 528-173.000.

Minnesota Mining and Manufacturing Company: *See—*
Appeldorn, Roger H., 4,875,259, Cl. 24-576.000.
Chang, Robert W. H.; and Relyea, Keith E., 4,876,136, Cl. 428-130.000.
Elder, Jerome E.; and Mosman, Nancy L., 4,875,609, Cl. 225-13.000.
May, David C., 4,875,798, Cl. 404-12.000.
Payet, George L.; and Chang, John C., 4,875,901, Cl. 8-115.560.
Ramharack, Roopram, 4,876,149, Cl. 428-425.900.
Rao, Ram A.; Kofod, Mogens; Puchammer, Julius; and Galiotti, George, 4,875,754, Cl. 350-96.200.
Rivera, Raymond R.; VanVleet, Stephen B.; and Wilson, Shari J., 4,876,123, Cl. 428-34.200.

Minnesota Mining and Manufcturing: *See—*
Donnay, James A.; Jensen, Van E., Jr.; and Kruzel, Bryon S., 4,875,895, Cl. 493-117.000.

Minolta Camera Kabushiki Kaisha: *See—*
Hara, Kazuyoshi; and Oda, Masataka, 4,876,578, Cl. 355-315.000.
Hirasawa, Hideaki; and Ueda, Nobuo, 4,875,768, Cl. 353-27.00A.
Hotomi, Hideo; Osawa, Izumi; Iino, Syuji; Doi, Isao; and Fujiwara, Masanori, 4,876,168, Cl. 430-58.000.
Yamakawa, Kazuo, 4,875,763, Cl. 350-432.000.

Misaizu, Kouei: *See—*
Endo, Haruyoshi; Misaizu, Kouei; and Makimoto, Mitsuo, 4,876,744, Cl. 455-326.000.

Misawa, Shigeyoshi; and Funato, Hiroyoshi, to Ricoh Company, Ltd. Monolithic optical pick-up using an optical waveguide. 4,876,680, Cl. 369-110.000.

Miselli, Carlo A., to I.M.A. - Industrie Macchine Automatiche S.p.A. Wrapping machine, particularly for blister packs and the like, with synchronized plural driving means. 4,875,329, Cl. 53-559.000.

Mishima, Osamu; Yamaoka, Shinobu; Fukunaga, Osamu; Tanaka, Junzo; and Era, Koh, to National Institute for Research in Inorganic Materials. Method for growing a single crystal of cubic boron nitride semiconductor and method for forming a p-n junction thereof, and light emitting element. 4,875,967, Cl. 156-605.000.

Mishra, Indu B.; and Vande Kieft, Lawrence J., to United States of America, Army. Insensitive binder for propellants and explosives. 4,875,949, Cl. 149-19.300.

Mitani, Kazutami: *See—*
Itoh, Hajime; and Mitani, Kazutami, 4,876,289, Cl. 521-54.000.

Mitchell, Cheryl R.; Mitchell, Pat R.; and Mitchell, William A., to California Natural Products. Rice syrup sweetener. 4,876,096, Cl. 426-28.000.

Mitchell, Debra J.; and Ranzau, Cheryl L. Washable and contoured nursing pads. 4,875,492, Cl. 128-890.000.

Mitchell, Pat R.: *See—*
Mitchell, Cheryl R.; Mitchell, Pat R.; and Mitchell, William A., 4,876,096, Cl. 426-28.000.

Mitchell, Roy O.; Klaudt, Milton D.; and Ullom, Kathleen F. M., to Tektronix, Inc. Remote video interconnect and method. 4,876,484, Cl. 315-94.000.

Mitchell, William A.: *See—*
Mitchell, Cheryl R.; Mitchell, Pat R.; and Mitchell, William A., 4,876,096, Cl. 426-28.000.

Mitlmeier, Norbert; and Koppmann, Bardo, to Siemens Aktiengesellschaft. Electromagnetic switchgear. 4,876,522, Cl. 335-193.000.

Mito, Nobuaki: *See—*
Mizutani, Masato; Shiroshita, Masao; Sakaki, Masaharu; Okuda, Hiroki; and Mito, Nobuaki, 4,875,924, Cl. 71-92.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Hara, Toshiro; Fujimoto, Takanori; and Musa, Ikuo, 4,875,452, Cl. 123-488.000.
Imai, Hitoshi; Okada, Kazuo; and Tadokoro, Michihiro, 4,876,666, Cl. 365-106.000.
Kawabata, Akira; Terasaki, Yoshikazu; Inoue, Takashi; and Takita, Hidenori, 4,876,479, Cl. 313-440.000.
Kondou, Harufusa; and Kuranaga, Hiroshi, 4,876,466, Cl. 307-465.000.
Kusakabe, Kenji, 4,876,224, Cl. 437-228.000.
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, 4,875,434, Cl. 118-52.000.
Morishita, Mitsuharu; Kohge, Shinichi; Hara, Tadayuki; Hata, Yasuaki; and Umemaru, Hisato, 4,875,367, Cl. 73-118.100.
Nakabayashi, Takeo; and Nakaya, Masao, 4,876,670, Cl. 365-194.000.
Shimodaira, Hisayo; Ono, Toshio; Miyawaki, Keizo; and Hamaguchi, Tatsuya, 4,875,766, Cl. 350-641.000.
Suzuki, Akinobu, 4,875,752, Cl. 350-96.200.
Tanaka, Toshinori; Miyazaki, Shigekazu; and Morishita, Akira, 4,876,473, Cl. 310-216.000.
Watakabe, Yaichiro; Okamoto, Tatsuo; and Matsuda, Shuichi, 4,876,164, Cl. 430-5.000.
Yoshida, Shigeyuki; Musha, Atsushi; and Nonami, Takayuki, 4,876,714, Cl. 379-433.000.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Asai, Yoshiro, 4,875,658, Cl. 129.21-.
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.
Kasugai, Heki, 4,875,415, Cl. 104-35.000.

Mitsubishi Kasei Corporation: *See—*
Doi, Yoshiharu, 4,876,331, Cl. 528-361.000.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Nakano, Yoshitomo; and Kada, Masumi, 4,876,324, Cl. 528-142.000.

Mitsubishi Rayon Co., Ltd.: *See—*
Arita, Masujiro; and Sugimoto, Yukinobu, 4,875,980, Cl. 203-14.000.
Itoh, Hajime; and Mitani, Kazutami, 4,876,289, Cl. 521-54.000.
Kurokawa, Satoshi; Tayama, Suehiro; and Sato, Fumio, 4,876,306, Cl. 524-423.000.

Mitsubishi Rayon Engineering Co., Ltd.: *See—*
Arita, Masujiro; and Sugimoto, Yukinobu, 4,875,980, Cl. 203-14.000.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Nakanishi, Takehisa; Koga, Eizi; and Fukada, Isao, 4,876,372, Cl. 549-529.000.

Mittler, Martin A.; and Scowen, Kenneth J., to Voltronics Corporation. Variable electronic component. 4,876,627, Cl. 361-293.000.

Miura, Masakatsu: *See—*
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, 4,875,392, Cl. 74-867.000.

Miwa, Hiroshi: *See—*
Fuse, Genzo; Miwa, Hiroshi; and Kawasaki, Yoshinobu, 4,875,823, Cl. 414-735.000.

Miyagawa, Michiaki; Ishizaka, Yutaka; and Shimomura, Shoji, to Fuji Electric Co., Ltd. System for detecting rotational angle of objective pattern. 4,876,732, Cl. 382-41.000.

Miyakawa, Yasuhiro; and Machida, Minoru, to NGK Insulators, Ltd. Precombustion chamber construction for an internal combustion engine. 4,875,939, Cl. 123-271.000.

Miyake, Kazutoshi: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yo-

shiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Miyamoto, Takashi, to NEC Corporation. Semiconductor device having ceramic package incorporated with a heat-radiator. 4,876,588, Cl. 357-81.000.

Miyano, Hideyo: *See—*
Kubota, Shin'ichi; Miyano, Hideyo; and Adachi, Hiromitsu, 4,876,529, Cl. 340-450.300.

Miyasaka, Tsutomu; Okazaki, Masaki; and Sugimoto, Tadao, to Fuji Photo Film Co., Ltd. Tubular silver halide photosensitive materials sensitized with a luminous dye. 4,876,183, Cl. 430-567.000.

Miyawaki, Keizo: *See—*
Shimodaira, Hisayo; Ono, Toshio; Miyawaki, Keizo; and Hamaguchi, Tatsuya, 4,875,766, Cl. 350-641.000.

Miyazaki, Shigekazu: *See—*
Tanaka, Toshinori; Miyazaki, Shigekazu; and Morishita, Akira, 4,876,473, Cl. 310-216.000.

Miyazawa, Kazutoshi: *See—*
Saito, Shinichi; Inoue, Hiromichi; Miyazawa, Kazutoshi; Ohno, Kouji; and Ushioda, Makoto, 4,876,026, Cl. 252-299.610.

Miyazawa, Takeshige: *See—*
Matsuzawa, Masafumi; Hokari, Hiroshi; Kusano, Shoji; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,875,930, Cl. 71-106.000.

Miyoshi, Kenichi: *See—*
Yamane, Akio; Kawasoe, Tatsuro; Tsukumo, Noriko; and Miyoshi, Kenichi, 4,876,335, Cl. 536-27.000.

Miyoshi, Makoto: *See—*
Uchida, Koh; Kurihara, Takashi; and Miyoshi, Makoto, 4,875,542, Cl. 180-142.000.

Mizobuchi, Tadafumi; Ohji, Akihito; Sakoh, Seiichi; and Muguruma, Yasuyoshi, to Teikoku Seiyaku Kabushiki Kaisha. Sheet-shaped adhesive preparation applicable to oral cavity. 4,876,092, Cl. 424-435.000.

Mizuno, Shinji; Kawato, Humio; Hanazawa, Kazuyoshi; Aoyama, Tatsuaki; and Ogasawara, Yoshinari, to CKD Kabushiki Kaisha. Apparatus for separating gaseous mixtures. 4,875,911, Cl. 55-162.000.

Mizutani, Futoshi; Kyogoku, Takeshi; Saitoh, Tatsuo; and Endoh, Shigeki, to Sumitomo Electric Industries, Ltd. Method of manufacturing fiber preform for single-mode fibers. 4,875,918, Cl. 65-3.120.

Mizutani, Hikaru, to Hitachi Maxell, Ltd. Tape cartidge. 4,875,640, Cl. 242-198.000.

Mizutani, Masato; Shiroshita, Masao; Sakaki, Masaharu; Okuda, Hiroki; and Mito, Nobuaki, to Sumitomo Chemical Company, Limited. Cinnoline derivative, process for preparing the same and herbicidal composition containing the same. 4,875,924, Cl. 71-92.000.

Mobay Corporation: *See—*
Milliren, Charles M., 4,876,292, Cl. 521-159.000.

Mobil Oil Corporation: *See—*
Bowes, Emmerson; Chang, Clarence D.; Han, Scott; and Shihabi, David S., 4,876,411, Cl. 585-533.000.
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.
Furtek, Allan B., 4,876,229, Cl. 502-107.000.
Lo, Frederick Y.; Nowlin, Thomas E.; and Wu, Margaret M., 4,876,321, Cl. 526-129.000.
McCowan, Douglas W., 4,876,673, Cl. 367-68.000.

Mochizuki, Seiji; and Kato, Fumiyasu, to Toppan Moore Company, Ltd. Paper splicing device. 4,875,633, Cl. 242-58.300.

Mode, Duane R., to Waldorf Corporation. Locking, double-layered microwave package. 4,876,427, Cl. 219-10.55E.

Moe, Rolf; Corriea, David J.; and Premeau, John E., to Biorne Enterprises, Inc. Wafer transfer apparatus. 4,875,824, Cl. 414-751.000.

Moeckl, Ernst; Stumpf, Jorg; Hardt, Walter; and Doinghaus, Hermann, to Nixdorf Computer AG. Set of components for constructing furniture pieces. 4,875,418, Cl. 108-50.000.

Moeneclaey, Denis; Coopman, Lucien; and Victoor, Johnny, to Picanol N.V. Thread clamp. 4,875,505, Cl. 139-448.000.

Mohsen, Amr M.; Hamdy, Esmat Z.; and McCollum, John L., to Actel Corporation. Method of making programmable low impedance interconnect diode element. 4,876,220, Cl. 437-170.000.

Moist, Stanford C., Jr.: *See—*
Fleak, David S.; Koegel, Keith S.; Long, William B.; Moist, Stanford C., Jr.; and Nauman, Warren D., 4,875,877, Cl. 439-497.000.

Molex Incorporated: *See—*
Finney, James E.; and Brubaker, Weldon L., 4,875,582, Cl. 206-330.000.

Moller, Ronald H.; and Batty, Alan K., to Thermit Australia Pty. Limited. Rail repairing method and apparatus. 4,875,657, Cl. 249-86.000.

Mollmann, Gunter: *See—*
Onnenberg, Volker; and Mollmann, Gunter, 4,875,843, Cl. 425-4.00R.

Moly, Jose: *See—*
Leandris, Sergio; and Moly, Jose, 4,875,286, Cl. 29-872.000.

Monroe, George E., to Magline, Inc. Boat trailers. 4,875,700, Cl. 280-414.100.

Monsell, Craig C.: *See—*
Snyder, Stephen W.; Monsell, Craig C.; and Puckett, Carol S., 4,875,575, Cl. 206-0.500.

Montana Refining Company: *See—*
Langford, Virgil, 4,875,997, Cl. 208-235.000.

Monteiro, Luciano T. S., to Prodty Engenharia E Comercio Ltda. Parts transfer system having three orthogonal movement axes wherein the part lifting and lowering mechanism moving along the third axis is actuated by the motion of the grippers in closing and opening along the first axis. 4,875,931, Cl. 72-405.000.

Montgomery Elevator Company: *See—*
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, 4,875,552, Cl. 187-1.00R.
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, 4,875,553, Cl. 187-1.00R.

Montgomery, Larry D.: *See—*
Stringer, Hugh C., and Montgomery, Larry D., 4,875,580, Cl. 206-319.000.

Montgomery, Melvin G., to Atlantic Richfield Company. Cryosonde for well logging tool. 4,876,450, Cl. 250-261.000.

Montrym, Anthony. Expansion joint brace and aligner. 4,875,801, Cl. 404-48.000.

Mookherjee, Braja D.: *See—*
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.

Moopen, Alexander: *See—*
Thakoor, Anilkumar P.; Lambe, John; and Moopen, Alexander, 4,876,668, Cl. 365-163.000.

Moore, Alan F., to Dunlop Limited a British Company. Vibration attenuation. 4,875,664, Cl. 267-140.100.

Moore Business Forms, Inc.: *See—*
Ashby, Robert E.; and Greig, Walter G., 4,876,131, Cl. 428-42.000.

Moore, James D.: *See—*
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.

Moore, John S.: *See—*
Anderson, Jeffrey J.; and Moore, John S., 4,875,619, Cl. 228-190.000.

Moore, Michael L.: *See—*
Marshall, Garland R.; and Moore, Michael L., 4,876,243, Cl. 514-11.000.

Moorthy, Kanniah N. G. K.: *See—*
Singh, Vir B.; Moorthy, Kanniah N. G. K.; Kaushik, Pushpendar K.; and Sankarasub-Ramanian, Hariharan, 4,875,900, Cl. 8-94.270.

Moran, Kevin E.; Smith, Michael L.; and Lippard, Ernest R., III, to Eastman Kodak Company. Method and apparatus for inspecting reticles. 4,875,780, Cl. 356-446.000.

Morgan, Leonard J.; and Bell, Mark, to American Cyanamid Company. Aqueous suspension concentrate compositions. 4,875,929, Cl. 71-121.000.

Morgan, Richard A.: *See—*
Lester, Gene D.; Morgan, Richard A.; Harms, Harold B.; Barrett, John P.; Chang, Tsung K.; Cushing, Donald S.; Broo, Richard F.; and Hood, William M., 4,876,492, Cl. 318-254.000.

Morgenthaler, Eugen, to Seewer AG. Method of rolling dough. 4,876,098, Cl. 426-231.000.

Mori, Kei; and Kosugi, Isao, to Mori, Kei. Mechanism for positioning the light-receiving end of an optical conductor cable at the focal position of a lens. 4,875,749, Cl. 350-96.180.

Morimoto, Akira; Choh, Nobuo; and Noguchi, Noriyoshi, to Takeda Chemical Industries, Ltd. Tricyclic penam compounds, their production and their use. 4,876,251, Cl. 514-193.000.

Morishita, Akira: *See—*
Tanaka, Toshinori; Miyazaki, Shigekazu; and Morishita, Akira, 4,876,473, Cl. 310-216.000.

Morishita, Mitsuharu; Kohge, Shinichi; Hara, Tadayuki; Hata, Yasuaki; and Umemaru, Hisato, to Mitsubishi Denki Kabushiki Kaisha. Steering torque detecting device. 4,875,367, Cl. 73-118.100.

Moriya, Ikuro: *See—*
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.

Moriya, Koichi: *See—*
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,876,263, Cl. 514-338.000.

Moriya, Tatsuo, to Seiko Epson Corporation. Sensor mount for an electronic timepiece. 4,876,677, Cl. 368-87.000.

Moriyama, Hiroshi: *See—*
Yabe, Akira; Ouchi, Akihiko; Moriyama, Hiroshi; and Masuda, Etsuro, 4,875,986, Cl. 204-157.600.

Morohashi, Katsuei; Shimokobe, Jiro; and Shimoma, Taketoshi, to Kabushiki Kaisha Toshiba. Cathode ray tube apparatus with improved deflection unit. 4,876,478, Cl. 313-413.000.

Morozumi, Naoya: *See—*
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.

Moruta, Masaya: *See—*
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,875,835, Cl. 417-295.000.

Mosch, Karl E.: *See—*
Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., 4,876,066, Cl. 422-46.000.

Moschensky, Anatoly D.: *See—*
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.

Mose, Tadao; Andoh, Yasuhiro; and Kitasin, Tatuhisa, to Kabushiki Kaisha Toshiba. Power converter and method of controlling the same. 4,876,637, Cl. 363-37.000.

Moseley, John: *See—*
Santos, Alfred J.; Cook, Frederick A., Jr.; Duncan, Scott M.; and Moseley, John, 4,875,785, Cl. 384-448.000.

Mosman, Nancy L.: *See—*
Elder, Jerome E.; and Mosman, Nancy L., 4,875,609, Cl. 225-13.000.

Motegi, Itsuro: *See—*
Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, 4,876,084, Cl. 424-62.000.

Motley, Jerry D.: *See—*
Christopher, Glenn B.; and Motley, Jerry D., 4,875,413, Cl. 102-307.000.

Motora, Yoichi: *See—*
Yoshioka, Ritsuo; Ueda, Makoto; Motora, Yoichi; and Nakamura, Mitsuharu, 4,876,060, Cl. 376-333.000.

Motorola, Inc.: *See—*
Dougherty, Richard M., 4,876,516, Cl. 330-54.000.
Gay, Michael J., 4,876,464, Cl. 307-353.000.
Koury, Daniel N., 4,876,212, Cl. 437-34.000.
Leicht, John L.; and Leitheiser, Jeffrey D., 4,876,656, Cl. 364-491.000.
Levine, Stephen N.; and Leitich, Albert J., 4,876,740, Cl. 455-33.000.
Perkins, Geoffrey W., 4,876,518, Cl. 331-1.00A.
Pfiester, James R., 4,876,213, Cl. 437-34.000.
Reed, John D.; Roberts, Teddy P.; and Berger, Thomas R., 4,876,710, Cl. 379-63.000.
van Bavel, Nicholas; and Williams, Tim A., 4,876,542, Cl. 341-143.000.
van Bavel, Nicholas R., 4,876,543, Cl. 34.1-143.000.
Zakman, Zdravko M., 4,876,552, Cl. 343-702.000.
Zdebel, Peter J., 4,876,217, Cl. 437-67.000.

Mouri, Toyohiko: *See—*
Oshita, Saiichiro; Mouri, Toyohiko; and Takahaski, Tsutomu, 4,875,540, Cl. 180-79.100.
Oshita, Saiichiro; Mouri, Toyohiko; Takahashi, Tsutomu; and Itou, Shinji, 4,875,541, Cl. 180-79.100.

Movilliat, Pierre A.; Piegay, Yves; and Gardin, Gilles D., to Societe SKIS ROSSIGNOL S.A. Tennis racket. 4,875,679, Cl. 273-73.00R.

Moyer, Donald L.; and Allred, Thomas O. Wheel chock. 4,875,813, Cl. 410-9.000.

Moyer, George A.; and Chang, Chung L. Seatback recliner mechanism. 4,875,735, Cl. 297-367.000.

MTU Motoren- und Turbinen-Union Friedrichshafen GmbH: *See—*
Just, Karl, 4,875,784, Cl. 384-273.000.

MTU Motoren-und Turbinen-Union Munchen GmbH: *See—*
Willkop, Franz; Zahring, Gerhard; Rutsch, Robert; Popp, Joachim; and Eberhard, John, 4,875,828, Cl. 415-173.400.

Mueller, Richard A.: *See—*
Koszyk, Francis J.; Partis, Richard A.; and Mueller, Richard A., 4,876,268, Cl. 514-425.000.

Muellers, John H. Dovetail machine. 4,875,510, Cl. 144-145.00A.

Muguruma, Yasuyoshi: *See—*
Mizobuchi, Tadafumi; Ohji, Akihito; Sakoh, Seiichi; and Muguruma, Yasuyoshi, 4,876,092, Cl. 424-435.000.

Mukai, Toshiharu, to Matsushita Electric Industrial Co., Ltd. Digitally controlled positioning system for quickly moving and then finely positioning an object. 4,876,679, Cl. 369-44.000.

Muller, Ingrid: *See—*
Hemmerling, Wolfgang; Dubal, Hans-Rolf; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,876,028, Cl. 252-299.610.

Muller, Manfred: *See—*
Knobloch, Osbert; and Muller, Manfred, 4,875,628, Cl. 241-24.000.

Mullin, Francis J.; and Reed, William C., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Forced encapsulation means for a cable. 4,875,952, Cl. 156-48.000.

Mumford, Van E.: *See—*
Vollmann, William; and Mumford, Van E., 4,875,483, Cl. 128-419.0PG.

Munakata, Chusuke: *See—*
Takeda, Kazuo; Ito, Yoshitoshi; Honma, Noriaki; and Munakata, Chusuke, 4,876,458, Cl. 250-574.000.

Munk, Harald, to NOVOPACK Maschinenbau GmbH. Coffee bean roaster. 4,875,904, Cl. 34-67.000.

Munzer, Manfred: *See—*
Hennig, Jurgen; Vetter, Heinz; and Munzer, Manfred, 4,876,311, Cl. 525-229.000.

Murai, Keiichi: *See—*
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,876,185, Cl. 430-580.000.

Murakami, Kanji: *See—*
Akahoshi, Haruo; Murakami, Kanji; Kawamoto, Mineo; Tadokoro, Akio; and Yoshimura, Toyofusa, 4,876,177, Cl. 430-313.000.

Murakami, Kazunori: *See—*
Matsumoto, Yasuo; Murakami, Kazunori; Ikumi, Tomonori; and Iwafune, Yasuo, 4,875,748, Cl. 350-6.800.

Murakami, Mutsuaki, to Research Development Corp. of Japan; and Matsushita Elec. Industries Co. Ltd., a part interest. Process for producing graphite. 4,876,077, Cl. 423-448.000.

Murakami, Takuya, to Nissan Motor Co., Ltd. Double link type suspension including a stabilizer bar. 4,875,703, Cl. 280-665.000.

Muramatsu, Akira, to Fuji Photo Film Co. Color video signal generating device using monochrome and color image sensors having different resolutions to form a luminance signal. 4,876,591, Cl. 358-43.000.

Muramatsu, Keiji: *See—*
Oda, Noriyuki; Takehara, Tetsuo; Higashi, Katsumi; and Muramatsu, Keiji, 4,875,712, Cl. 285-47.000.

Murasaki, Hiroaki: *See—*
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.

Murata Kikai Kabushiki Kaisha: *See—*
Kiriake, Masaharu, 4,875,572, Cl. 198-744.000.

Murata manufacturing Co., Ltd.: *See—*
Endo, Masanori; and Watanabe, Kouichi, 4,876,631, Cl. 361-502.000.
Kittaka, Toshihiko; Ando, Akira; and Sakabe, Yukio, 4,876,476, Cl. 310-320.000.
Sakamoto, Yukio; Tanabe, Takeshi; Fukutani, Iwao; and Hori, Toshio, 4,875,862, Cl. 439-79.000.

Murdock, Inc.: *See—*
Horton, Jack, 4,876,050, Cl. 264-102.000.

Murphy, Bruce L.: *See—*
Schumacher, Doris P.; Clark, Jon E.; and Murphy, Bruce L., 4,876,352, Cl. 548-232.000.

Murphy, Lawrence M., to United States of America, Energy. Support and maneuvering apparatus for solar energy receivers. 4,875,467, Cl. 126-424.000.

Murphy, Philip: *See—*
Cipolla, Thomas M.; Horton, Raymond R.; Murphy, Philip; and Palmer, Michael J., 4,875,614, Cl. 228-5.500.

Murray, Charles N.; and Jamet, Michel R., to European Economic Community. Braking device for a capsule at the end of a trajectory. 4,875,429, Cl. 114-331.000.

Murumoto, Katsuji: *See—*
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Musa, Ikuo: *See—*
Hara, Toshiro; Fujimoto, Takanori; and Musa, Ikuo, 4,875,452, Cl. 123-488.000.

Musha, Atsushi: *See—*
Yoshida, Shigeyuki; Musha, Atsushi; and Nonami, Takayuki, 4,876,714, Cl. 379-433.000.

Musser, John H.; Kreft, Anthony F., III; and Bender, Reinhold H. W., to American Home Products Corporation. Quinoline compounds. 4,876,346, Cl. 546-172.000.

Mutai, Masahiko: *See—*
Ishiwa, Hiromi; Shibahara, Harue; Mutai, Masahiko; and Tsuchida, Nobuo, 4,876,202, Cl. 435-320.000.

Mutchler, Paul A., to Engineered Air Systems, Inc. Steady state fuel burner assembly for a heat exchanger and method of operating same. 4,875,851, Cl. 431-6.000.

Mutzabaugh, Dennis M.: *See—*
Citta, Richard W.; Gosc, Paul M.; Mutzabaugh, Dennis M.; and Sgrignoli, Gary J., 4,876,718, Cl. 380-42.000.

Myers, John D., to Kigre, Inc. Ion-exchangeable phosphate glass compositions and strengthened optical quality glass articles. 4,875,920, Cl. 65-30.140.

Myers, Melvyn J.; and Nickolson, Victor J., to Du Pont de Nemours, E. I., and Company. 3,3-disubstituted indolines. 4,876,259, Cl. 514-256.000.

Myhre, Erling: *See—*
Bjorck, Lars; Erntell, Mats; and Myhre, Erling, 4,876,194, Cl. 435-68.000.

Mylett, Christopher J. Universal hose connector. 4,875,719, Cl. 285-239.000.

Mytec Technologies Inc.: *See—*
Tomko, George J., 4,876,725, Cl. 382-4.000.

Nachtkamp, Klaus: *See—*
Noll, Klaus; Thoma, Wilhelm; Nachtkamp, Klaus; Schroer, Walter; and Pedain, Josef, 4,876,302, Cl. 524-267.000.

Nagahori, Atsushi, to Nippon Mektron, Ltd. PTC devices. 4,876,439, Cl. 219-541.000.

Nagai, Hiroshi: *See—*
Ohkubo, Kazuo; Hayashi, Tadamasa; and Nagai, Hiroshi, 4,876,006, Cl. 210-321.690.

Nagai, Toshitake: *See—*
Tsukahara, Hitoshi; Kurokawa, Keiko; Tsukui, Toshimitsu; and Nagai, Toshitake, 4,876,070, Cl. 422-122.000.

Nagaoka, Akira: *See—*
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,876,446, Cl. 250-221.000.

Nagasawa, Moriya: *See—*
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, 4,876,560, Cl. 346-153.100.

Nagatomo, Shigemi: *See—*
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.

Nagatsuna, Shinji, to Ricoh Company, Ltd. Image recording having a removable image forming case. 4,876,572, Cl. 355-210.000.

Nagel, Rolf: *See*—
Deneke, Ulfert; Nagel, Rolf; Rothe, Anselm; and Freitag, Helmut, 4,876,067, Cl. 422-56.000.
Nagji, Moez M.; and Trubac, Robert E., to UOP. Process for the production of methyl tert.-alkyl ethers. 4,876,394, Cl. 568-697.000.
Nagura, Nobuyoshi: *See*—
Oka, Hiroki; and Nagura, Nobuyoshi, 4,876,527, Cl. 340-441.000.
Nair, Muraleedharan G.: *See*—
Burke, Basil A.; and Nair, Muraleedharan G., 4,876,277, Cl. 514-465.000.
Najjar, Mitri S.; and Corbeels, Roger J., to Texaco Inc. Partial oxidation process. 4,876,031, Cl. 252-373.000.
Nakabayashi, Shigemitsu: *See*—
Imura, Takeshi; Ando, Katsuhiko; Nakabayashi, Shigemitsu; and Hirose, Maki, 4,875,518, Cl. 164-119.000.
Nakabayashi, Takeo; and Nakaya, Masao, to Mitsubishi Denki Kabushiki Kaisha. Variable delay circuit for delaying input data. 4,876,670, Cl. 365-194.000.
Nakagawa, Shizutoshi: *See*—
Yoshida, Susumu; Nakagawa, Shizutoshi; Ushiroguchi, Tsuyoshi; Matsuura, Hiromichi; and Yazaki, Akira, 4,876,281, Cl. 514-517.000.
Nakahashi, Masako: *See*—
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; and Yamazaki, Tatsuo, 4,876,119, Cl. 427-250.000.
Nakajima, Junya: *See*—
Abe, Akira; Nakajima, Junya; Takase, Haruo; Uenaka, Kazushige; and Otomo, Ruyzi, 4,876,180, Cl. 430-393.000.
Nakajima, Kunihiko: *See*—
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, to Diesel Kiki Co., Ltd. Variable displacement compressor. 4,875,835, Cl. 417-295.000.
Nakajima, Sadaaki; and Terakawa, Taiju, to Chisso Corporation. Spinneret assembly for sheath-core type composite fibers. 4,875,844, Cl. 425-131.500.
Nakajima, Yoshihiro: *See*—
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.
Nakamichi Corporation: *See*—
Chikashige, Tadaaki, 4,876,615, Cl. 360-43.000.
Nakamura, Hideaki: *See*—
Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, 4,876,669, Cl. 365-189.010.
Nakamura, Kazuhiko: *See*—
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.
Nakamura, Kimihiko: *See*—
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, 4,875,607, Cl. 222-643.000.
Nakamura, Koichi: *See*—
Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, 4,876,084, Cl. 424-62.000.
Nakamura, Masahiro: *See*—
Watanabe, Yuji; and Nakamura, Masahiro, 4,876,729, Cl. 382-22.000.
Nakamura, Mitsuharu: *See*—
Yoshioka, Ritsuo; Ueda, Makoto; Motora, Yoichi; and Nakamura, Mitsuharu, 4,876,060, Cl. 376-333.000.
Nakamura, Takashi: *See*—
Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, 4,876,161, Cl. 428-691.000.
Nakamura, Teruya: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,876,244, Cl. 514-19.000.
Nakamura, Tsutomu: *See*—
Itoh, Kunio; Fukushima, Motoo; and Nakamura, Tsutomu, 4,876,344, Cl. 544-219.000.
Nakamura, Yoko; Kojima, Fumiyo; and Yoshino, Hirobumi, to Ricoh Company, Ltd. Copying machine having a bar code reader. 4,876,571, Cl. 355-210.000.
Nakamuraya Co., Ltd.: *See*—
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.
Nakanishi, Takehisa; Koga, Eizi; and Fukada, Isao, to Mitsui Toatsu Chemicals, Incorporated. Method for preparing epichlorohydrins. 4,876,372, Cl. 549-529.000.
Nakano, Mitsusou: *See*—
Chado, Hiroyuki; Maeda, Tatsuo; and Nakano, Mitsusou, 4,875,733, Cl. 296-195.000.
Nakano, Yoshitomo; and Kada, Masumi, to Mitsubishi Petrochemical Co., Ltd. High molecular weight ortho cresol-novolak resins and process for the preparation thereof using alcoholic or acidic organic solvents. 4,876,324, Cl. 528-142.000.
Nakano, Yuzuru, to Kanai Juyo Hyogo, Kogyo Company Limited. Plastic traveller for ring spinning machinery. 4,875,333, Cl. 57-125.000.
Nakaoka, Junichi: *See*—
Wada, Toshiaki; Katsuyama, Yoshiaki; and Nakaoka, Junichi, 4,875,987, Cl. 204-192.150.
Nakaoku, Shozo; Sakuma, Kazuhiko; Oshika, Yasuhiro; and Ohira, Kazuo, to Taiyo Pharmaceutical Industry Co., Ltd. Indene compounds. 4,876,345, Cl. 544-379.000.
Nakashio, Miaki: *See*—
Urata, Kaoru; Nakashio, Miaki; Ono, Koichi; Hirai, Hitoshi; and Iwamoto, Masayuki, 4,876,703, Cl. 377-62.000.
Nakata, Akiro: *See*—
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.
Nakatsuji, Teruyuki: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.
Nakaya, Masao: *See*—
Nakabayashi, Takeo; and Nakaya, Masao, 4,876,670, Cl. 365-194.000.
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, to Nippon Steel Corporation. Method for producing grain-oriented electrical steel sheet having metallic luster and excellent punching property. 4,875,947, Cl. 148-113.000.
Nakazato, Yasushi: *See*—
Banno, Masahiko; and Nakazato, Yasushi, 4,876,606, Cl. 358-434.000.
Nakazawa, Michitake: *See*—
Ishida, Hiroaki; Shinozaki, Nobuo; and Nakazawa, Michitake, 4,876,563, Cl. 354-234.100.
Nakazawa, Shinsuke: *See*—
Nemoto, Toshikazu; and Nakazawa, Shinsuke, 4,875,446, Cl. 123-339.000.
Nalco Chemical Company: *See*—
Gross, Anthony E.; and Bonin, Jacqueline L., 4,875,935, Cl. 75-117.000.
Napiorkowski, John J.: *See*—
Crosby, John J.; and Napiorkowski, John J., 4,876,713, Cl. 379-412.000.
Narita, Tadashi: *See*—
Hasegawa, Hiroshi; Shioiri, Noriaki; Narita, Tadashi; and Katori, Tatsuhiko, 4,876,359, Cl. 548-533.000.
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, to Fuji Photo Film Co., Ltd. Plate-type filter cartridge with internal support. 4,876,007, Cl. 210-339.000.
Nathrath, Norbert; and Fasold, Dietmar, to Messerschmitt-Bolkow-Blohm GmbH. Apparatus for adjusting the polarization plane of an antenna. 4,876,553, Cl. 343-756.000.
National Distillers and Chemical Corporation: *See*—
Hoyt, John M.; and Blazey, Steven D., 4,876,315, Cl. 525-346.000.
Mertz, William J.; and Braun, Robert J., 4,876,304, Cl. 524-314.000.
National Institute for Research in Inorganic Materials: *See*—
Mishima, Osamu; Yamaoka, Shinobu; Fukunaga, Osamu; Tanaka, Junzo; and Era, Koh, 4,875,967, Cl. 156-605.000.
National Radiological Protection Board: *See*—
Burgess, Peter H., 4,876,454, Cl. 250-370.140.
National Semiconductor Corporation: *See*—
Davis, Craig M.; and Rasmussen, Richard R., 4,876,519, Cl. 331-57.000.
Hilton, Robert; Emamjomeh, Ali; and Belani, Jagdish, 4,876,587, Cl. 357-70.000.
National Service Industries, Inc.: *See*—
Booty, Donald J., Sr.; and Booty, Donald J., Jr., 4,875,871, Cl. 439-209.000.
National Starch and Chemical Corporation: *See*—
Solarek, Daniel B.; Dirscherl, Teresa A.; Hernandez, Henry R.; and Jarowenko, Wadym, 4,876,336, Cl. 536-109.000.
Nauman, Warren D.: *See*—
Fleak, David S.; Koegel, Keith S.; Long, William B.; Moist, Stanford C., Jr.; and Nauman, Warren D., 4,875,877, Cl. 439-497.000.
Navistar International Transportation Corp.: *See*—
Miller, Arden O., 4,875,697, Cl. 280-95.100.
Nayar, Shree K.: *See*—
Sanderson, Arthur C.; Weiss, Lee E.; and Nayar, Shree K., 4,876,455, Cl. 250-560.000.
NCR Corporation: *See*—
Janning, John L., 4,876,582, Cl. 357-23.500.
Petersen, Borge; and Groot, William P., 4,875,670, Cl. 271-265.000.
Neal, Robert A.: *See*—
Ray, Robert; Neal, Robert A.; Jaran, John R.; and Parker, Tim, 4,875,581, Cl. 206-328.000.
NEC Corporation: *See*—
Fukushima, Masaya, 4,876,442, Cl. 250-205.000.
Ishijima, Toshiyuki, 4,876,581, Cl. 357-23.300.
Kobatake, Hiroyuki; and Jinbo, Toshikatsu, 4,876,462, Cl. 307-246.000.
Koya, Kei, 4,876,661, Cl. 364-787.000.
Kuraishi, Yoshiaki, 4,876,544, Cl. 341-166.000.
Matai, Masahiro; and Tsunoda, Kazuyuki, 4,876,536, Cl. 340-825.440.
Miyamoto, Takashi, 4,876,588, Cl. 357-81.000.
Okamoto, Eiji, 4,876,716, Cl. 380-21.000.
Oyamada, Takashi, 4,876,537, Cl. 340-825.440.
Ozaki, Hideharu, 4,876,704, Cl. 377-70.000.

Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.
Sasaki, Katsuhiro; and Fukuda, Seiji, 4,876,686, Cl. 371-49.100.
Yoshikawa, Toshio, 4,876,696, Cl. 375-5.000.

Nehl, Wolfgang, to fischerwerke Artur Fischer GmbH & Co. KG. Container for record carriers. 4,875,578, Cl. 206-309.000.

Neisen, Gerald F.: *See—*
Widmer, Steven L.; Neisen, Gerald F.; Ruhnke, Jeffrey P.; Steffes, Thomas J.; and Buchholz, Brian S., 4,875,439, Cl. 123-541.000.

Nelson, Blaine J., to Rockwell International Corporation. High speed sampled data digital phase detector apparatus. 4,876,699, Cl. 375-82.000.

Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, to General Electric Company. Enhancing color stability to sterlizing radiation of polymer compositions. 4,876,309, Cl. 524-109.000.

Nelson, Robert A.: *See—*
Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., 4,876,169, Cl. 430-110.000.

Nelson, Thomas E. Method of making spaced-wall appliance with a sealing and insulating device between said walls. 4,875,272, Cl. 29-451.000.

Nemoto, Toshikazu; and Nakazawa, Shinsuke, to Nissan Motor Company, Limited. System and method for controlling an engine idling speed for an internal combustion engine. 4,875,446, Cl. 123-339.000.

Neo Electronics Limited: *See—*
Fitton, Stephen, 4,875,567, Cl. 194-318.000.

NeoRx Corporation: *See—*
Wilbut, Daniel S.; and Hadley, Stephen W., 4,876,081, Cl. 424-1.100.

Nespor, Ronald R., to Chevron, Inc. Quick-couple L-bar sleeve assembly for wheel lift. 4,875,822, Cl. 414-563.000.

Neste Oy: *See—*
Suvanto, Erkki, 4,875,515, Cl. 152-210.000.

Netsu, Tositada: *See—*
Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, 4,875,618, Cl. 228-179.000.

Neubert, Donald F. Sanitizing device for a telephone. 4,876,715, Cl. 379-452.000.

Neumann, Peter: *See—*
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.

Neurodynamics, Inc.: *See—*
Hariri, Robert J.; Ghajar, Jamshid B. G.; and Ghahremani-Ghadjar, Fathali, 4,875,482, Cl. 128-352.000.

New Balance Athletic Shoe, Inc.: *See—*
Norton, Edward J.; Fram, Craig F.; Graham, Kenneth W.; and Smith, James A., 4,876,053, Cl. 264-255.000.

Nezuka, Masakazu: *See—*
Kushida, Osami; Ninomiya, Hisamitsu; Nezuka, Masakazu; and Ishikawa, Yoshihiko, 4,876,523, Cl. 337-299.000.

NGK Insulators, Ltd.: *See—*
Inoue, Satoru; and Futamura, Shoji, 4,875,264, Cl. 29-163.600.
Kodachi, Toru; and Usami, Jun, 4,875,990, Cl. 204-408.000.
Miyakawa, Yasuhiro; and Machida, Minoru, 4,875,939, Cl. 123-271.000.
Takeya, Fuminori; Fukuda, Naoya; and Suzuki, Miki, 4,875,970, Cl. 156-645.000.
Usami, Jun; Hattori, Akinobu; and Sasaki, Yuichi, 4,875,981, Cl. 204-1.00T.

NGK Spark Plug Co., Ltd.: *See—*
Akao, Shigeaki; and Taniguchi, Masato, 4,875,442, Cl. 123-90.390.
Ogura, Kohji; and Ogawa, Kasumi, 4,876,675, Cl. 367-155.000.

Nicholson, Walter P. Recreational vehicle gate valve actuator. 4,875,504, Cl. 137-899.000.

Nickolson, Victor J.: *See—*
Myers, Melvyn J.; and Nickolson, Victor J., 4,876,259, Cl. 514-256.000.

Nicol, Alan J.: *See—*
Creagan, Richard W.; and Nicol, Alan J., 4,875,977, Cl. 162-300.000.

Niederhuefner, Detlev; Hahn, Guenter; and Baczyzmalski, Andrzej, to Siemens Aktiengesellschaft. Combined high voltage connecting and grounding switch. 4,876,417, Cl. 200-48.00V.

Niehoff, Raymond L.: *See—*
Feeney, Robert D.; Prosise, Robert L.; McGrady, Joseph; and Niehoff, Raymond L., 4,876,102, Cl. 426-550.000.

Nihon Den-Netsu Keiki Co., Ltd.: *See—*
Kondo, Kenshi, 4,876,437, Cl. 219-388.000.

Nihon Tokushu Noyaku Seizo K.K.: *See—*
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,876,263, Cl. 514-338.000.

Nikkiso Co., Ltd.: *See—*
Arakawa, Kohei; and Ohsaki, Takashi, 4,876,078, Cl. 423-447.300.

Niklaus, Hans-Ulrich: *See—*
Zehnder, Paul; Niklaus, Hans-Ulrich; Schmiedl, Engelbert; and Patri, Franz, 4,875,836, Cl. 417-360.000.

Nilsen, Trond; and Normann, Erling C. Machine for adjustable longitudinal corrugating of sheet materials. 4,875,354, Cl. 72-180.000.

Ninomiya, Hisamitsu: *See—*
Kushida, Osami; Ninomiya, Hisamitsu; Nezuka, Masakazu; and Ishikawa, Yoshihiko, 4,876,523, Cl. 337-299.000.

Nippon Hoso Kyokai: *See—*
Kitamoto, Tatsuji; Yokoyama, Katsuya; and Sekiguchi, Takuji, 4,875,610, Cl. 226-10.000.

Nippon Mektron, Ltd.: *See—*
Nagahori, Atsushi, 4,876,439, Cl. 219-541.000.

Nippon Petrochemicals Co., Ltd.: *See—*
Aoyama, Takeo; Imai, Teruo; Hattori, Junichi; and Uehara, Mikio, 4,876,049, Cl. 264-49.000.

Nippon Seiko Kabushiki Kaisha: *See—*
Furumura, Kyozaburo, 4,875,263, Cl. 29-149.50S.

Nippon Shokubai Kasaku Kogyo Co., Ltd.: *See—*
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased, 4,875,909, Cl. 55-40.000.

Nippon Steel Corporation: *See—*
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, 4,875,947, Cl. 148-113.000.
Shindou, Yoshio; Kabeya, Motoo; Shimazu, Takashi; and Yamazaki, Fumio, 4,876,160, Cl. 428-623.000.

Nippon Telegraph and Telephone Corp.: *See—*
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.

Nippondenso Co., Ltd.: *See—*
Ozawa, Takashi; Tanaka, Hitoshi; Goshima, Takahiro; and Takagi, Kozi, 4,875,741, Cl. 303-116.000.
Sano, Ryuichi; and Isomura, Shigenori, 4,875,443, Cl. 123-179.00G.

Nishi, Yasuhiko: *See—*
Sugitani, Yuji; Sato, Yoshikazu; and Nishi, Yasuhiko, 4,876,432, Cl. 219-124.320.

Nishida, Masahiro, to Koyo Seiko Co., Ltd. Back-up roll in a rolling mill. 4,875,261, Cl. 29-116.100.

Nishida, Naoto; and Nishio, Mitsuhiro, to Kabushiki Kaisha Toshiba. Metal vapor laser apparatus. 4,876,690, Cl. 372-56.000.

Nishikawa, Hiroshi, to Canon Kabushiki Kaisha. Recording apparatus having a print permission circuit for protecting plural recording heads driven in accordance with selectively applied print signals from overload. 4,876,559, Cl. 346-140.00R.

Nishimura, Yasunobu; and Kawai, Toshikazu, to Central Glass Company, Limited. Process for making fluorobenzoic acid fluorophenylesters. 4,876,382, Cl. 560-109.000.

Nishio, Mitsuhiro: *See—*
Nishida, Naoto; and Nishio, Mitsuhiro, 4,876,690, Cl. 372-56.000.

Nishitoku, Yukitsugu, to Fuji Photo Film Co., Ltd. Image exposure apparatus. 4,876,569, Cl. 355-68.000.

Nishizawa, Jun-ichi, to Zaiden Hojin Handotai Kenkyu Shinkokai. Tunnel injection controlling type semiconductor device controlled by static induction effect. 4,876,580, Cl. 357-22.000.

Nissan Motor Company, Limited: *See—*
Hara, Junichiro; Ogihara, Yoshiyuki; and Takahashi, Hideo, 4,875,624, Cl. 236-49.500.
Kubo, Jun, 4,876,650, Cl. 364-426.020.
Murakami, Takuya, 4,875,703, Cl. 280-665.000.
Nemoto, Toshikazu; and Nakazawa, Shinsuke, 4,875,446, Cl. 123-339.000.
Tsuchida, Hirofumi; Tanaka, Toshiaki; Oyamada, Akira; and Hirao, Sumio, 4,875,444, Cl. 123-270.000.
Uchida, Koh; Kurihara, Takashi; and Miyoshi, Makoto, 4,875,542, Cl. 180-142.000.

Nissho Corporation: *See—*
Yoshida, Toshiki, 4,875,265, Cl. 29-240.000.

Nissin Electric Company, Ltd.: *See—*
Ogata, Kiyoshi; Ando, Yasunori; Kamijo, Eiji; and Matsumura, Noriaki, 4,875,284, Cl. 29-830.000.

Nitto Electric Industrial Co., Ltd.: *See—*
Higashi, Kazumi; and Noda, Yuzuru, 4,876,330, Cl. 528-353.000.

Nitto Kohki Co., Ltd.: *See—*
Sasa, Takeya; Kobayashi, Yoshikazu; and Makishima, Reichi, 4,875,720, Cl. 285-249.000.

Nixdorf Computer AG: *See—*
Moeckl, Ernst; Stumpf, Jorg; Hardt, Walter; and Doinghaus, Hermann, 4,875,418, Cl. 108-50.000.

Nixdorf, Richard D., to America Matrix, Inc. Method of producing a high temperature, high strength bond between a ceramic shape and metal shape. 4,875,616, Cl. 228-120.000.

NKK Corporation: *See—*
Iwasa, Hiroki; Watanabe, Toyofumi; and Furuya, Hirohide, 4,875,984, Cl. 204-56.100.
Sugitani, Yuji; Sato, Yoshikazu; and Nishi, Yasuhiko, 4,876,432, Cl. 219-124.320.

Nobumoto, Hidetoshi: *See—*
Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, 4,875,455, Cl. 123-568.000.

Nobuta, Hiroshi, to Canon Kabushiki Kaisha. Apparatus for communicating image data of different resolutions. 4,876,604, Cl. 358-400.000.

Noda, Hajime; Sato, Kuniyoshi; and Sotani, Junji, to Furukawa Electric Co., Ltd. Heat pipe heat exchanger. 4,875,522, Cl. 165-104.140.

Noda, Yuzuru: *See—*
Higashi, Kazumi; and Noda, Yuzuru, 4,876,330, Cl. 528-353.000.

Noffsinger, Alfred A. Collapsible display sign. 4,875,302, Cl. 40-610.000.

Nogami, Ikuo: *See—*
Shirafuji, Hideo; Yamaguchi, Takamasa; and Nogami, Ikuo, 4,876,195, Cl. 435-137.000.

Noguchi, Noriyoshi: *See*—
Morimoto, Akira; Choh, Nobuo; and Noguchi, Noriyoshi, 4,876,251, Cl. 514-193.000.

Noll, Klaus; Thoma, Wilhelm; Nachtkamp, Klaus; Schroer, Walter; and Pedain, Josef, to Bayer Aktiengesellschaft. Polyurethane dispersions and the use thereof as finishing agents. 4,876,302, Cl. 524-267.000.

Nomoto, Kenichi: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Nonami, Takayuki: *See*—
Yoshida, Shigeyuki; Musha, Atsushi; and Nonami, Takayuki, 4,876,714, Cl. 379-433.000.

Nook, Thomas J.: *See*—
Martin, Gregory G.; and Nook, Thomas J., 4,875,590, Cl. 211-55.000.

Normag Corporation: *See*—
Fox, Steve A., 4,875,782, Cl. 374-148.000.

Normann, Erling C.: *See*—
Nilsen, Trond; and Normann, Erling C., 4,875,354, Cl. 72-180.000.

North American Philips Corporation: *See*—
Lyle, Robert L., 4,876,463, Cl. 307-265.000.

Northern Telecom Limited: *See*—
Borkowicz, Jerzy, 4,876,620, Cl. 361-56.000.
Cwirzen, Casimir Z.; and Kupferschmidt, Albert, 4,875,868, Cl. 439-188.000.
Graves, Alan F.; Littlewood, Paul A.; and Weiss, Johannes S., 4,876,682, Cl. 370-66.000.
Greveling, Johannes, 4,875,757, Cl. 350-96.230.

Norton, Edward J.; Fram, Craig F.; Graham, Kenneth W.; and Smith, James A., to New Balance Athletic Shoe, Inc. Process of molding a component of a sole unit for footwear. 4,876,053, Cl. 264-255.000.

Norwood, Roger D.; Chun, Jino; and Patel, Pravin P., to Texas Instruments Incorporated. Semiconductor dynamic memory device with metal-level selection of page mode or nibble mode. 4,876,671, Cl. 365-233.000.

Nosanchuk, Jerry L. Needle cap replacement device. 4,875,583, Cl. 206-365.000.

Nosowitz, Martin: *See*—
Gardner, David M.; Wheaton, Gregory A.; and Nosowitz, Martin, 4,876,048, Cl. 260-543.00R.

Novo Industri A/S: *See*—
Enomoto, Michiyo; and Riisgaard, Steen, 4,876,024, Cl. 252-174.120.
Markussen, Erik K., 4,876,198, Cl. 435-183.000.

NOVOPACK Maschinenbau GmbH: *See*—
Munk, Harald, 4,875,904, Cl. 34-67.000.

Nowak, Deanne M.; and Lin, Henry C., to Occidental Chemical Corporation. Process for preparing 2,4,5-trifluorobenzoic acid. 4,876,387, Cl. 562-493.000.

Nowak, Ronald R.; and Cherko, Carl F., to Oerlikon Motch Corporation. Arbor assembly. 4,875,693, Cl. 279-2.00R.

Nowak, William W.: *See*—
Kadleck, Richard G.; and Nowak, William W., 4,875,585, Cl. 206-426.000.

Nowicki, Neal R.; and Thomka, Donald E., to Amoco Corporation. Batch or semicontinuous pseudocumene oxidation and catalyst recovery and recycle. 4,876,385, Cl. 562-414.000.

Nowicki, Neal R.: *See*—
Chiang, Weilong L.; Fjare, Douglas E.; and Nowicki, Neal R., 4,876,329, Cl. 528-353.000.

Nowlin, Thomas E.: *See*—
Lo, Frederick Y.; Nowlin, Thomas E.; and Wu, Margaret M., 4,876,321, Cl. 526-129.000.

Nozoe, Shigeo; and Ohta, Tomihisa, to Ajinomoto Co., Inc. Amino acid derivatives, their production and use in preparing carbapenem and carbapenam compounds. 4,876,383, Cl. 560-163.000.

Nuechterlein, David W.; and Rinaldi, Mark A., to International Business Machines Corp. Parallel pipelined processor. 4,876,644, Cl. 364-200.000.

Nukem GmbH: *See*—
Maurer, Albrecht; and Fabian, Josef, 4,876,727, Cl. 382-8.000.

N.V. Michel Van De Wiele: *See*—
Debaes, Johny, 4,875,507, Cl. 139-450.000.

Nvtek Security Products, Inc.: *See*—
McMaster, Richard L., 4,876,445, Cl. 250-221.000.

Nynex Corporation: *See*—
Loris, Keith; and Euchner, James, 4,876,731, Cl. 382-40.000.

O'Brien, William D., Jr.: *See*—
Baltzer, Gary L.; Lynch, Brian; and O'Brien, William D., Jr., 4,875,916, Cl. 65-2.000.

Occidental Chemical Corporation: *See*—
Nowak, Deanne M.; and Lin, Henry C., 4,876,387, Cl. 562-493.000.

Ochs, Charles S., to Anchor Hocking Corporation. Closure cap. 4,875,594, Cl. 215-252.000.

O'Connor, Lorne D.: *See*—
Roy, Bernard J. J.; O'Connor, Lorne D.; Rioux, Philippe F.; Dingle, Donald A.; and Raymond, Andre L., 4,876,597, Cl. 358-141.000.

O'Connor, Sean P., to BP Chemicals Limited. Lubricating oil compositions containing anti-wear/anti-corrosion. 4,876,021, Cl. 252-48.200.

Oda, Masataka: *See*—
Hara, Kazuyoshi; and Oda, Masataka, 4,876,578, Cl. 355-315.000.

Oda, Noriyuki; Takehara, Tetsuo; Higashi, Katsumi; and Muramatsu, Keiji, to Asahi Glass Company, Ltd. Joint structure for a tube support plate and a tube. 4,875,712, Cl. 285-47.000.

Oda, Noriyuki: *See*—
Arai, Yoshimasa; Enamito, Satoshi; and Oda, Noriyuki, 4,875,335, Cl. 60-274.000.

Oehling, Mark E.: *See*—
Jan, Chaur-Ming; and Oehling, Mark E., 4,875,435, Cl. 118-62.000.

Oerlikon Motch Corporation: *See*—
Nowak, Ronald R.; and Cherko, Carl F., 4,875,693, Cl. 279-2.00R.

Ofir, Arie. Hingedly connected cubical prisms amusement and display device. 4,875,681, Cl. 273-155.000.

Ogasawara, Yoshinari: *See*—
Mizuno, Shinji; Kawato, Humio; Hanazawa, Kazuyoshi; Aoyama, Tatsuaki; and Ogasawara, Yoshinari, 4,875,911, Cl. 55-162.000.

Ogata, Kiyoshi; Ando, Yasunori; Kamijo, Eiji; and Matsumura, Noriaki, to Nissin Electric Company, Ltd. Process for producing a package for packing semiconductor devices. 4,875,284, Cl. 29-830.000.

Ogawa, Kasumi: *See*—
Ogura, Kohji; and Ogawa, Kasumi, 4,876,675, Cl. 367-155.000.

Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Optical fiber and method of producing the same. 4,875,759, Cl. 350-96.340.

Ogawa, Kyosuke: *See*—
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,876,185, Cl. 430-580.000.

Ogihara, Yoshiyuki: *See*—
Hara, Junichiro; Ogihara, Yoshiyuki; and Takahashi, Hideo, 4,875,624, Cl. 236-49.500.

Ogino, Hidekazu: *See*—
Hirota, Hajime; Ogino, Hidekazu; Igarashi, Sahoko; and Sotoya, Kohshiro, 4,876,034, Cl. 252-546.000.

Ogura, Kohji; and Ogawa, Kasumi, to NGK Spark Plug Co., Ltd. Towed piezoelectric cable. 4,876,675, Cl. 367-155.000.

Ogura, Masaaki, to Ricoh Company, Ltd. Digital copier with a facsimile function. 4,876,609, Cl. 358-443.000.

Ogura, Mitsuru; and Tsukamoto, Kimihide, to Sharp Kabushiki Kaisha. Multi-component photoreceptor cartridge unit. 4,876,577, Cl. 355-315.000.

Ohara, Yuji, to Fuji Photo Film Co., Ltd. Bean recorder with a temperature sensor for light quantity control. 4,876,556, Cl. 346-108.000.

Ohhara, Nobuhiro: *See*—
Watanabe, Masataka; Ohhara, Nobuhiro; and Taguchi, Kenichi, 4,876,438, Cl. 219-497.000.

Ohira, Kazuo: *See*—
Nakaoku, Shozo; Sakuma, Kazuhiko; Oshika, Yasuhiro; and Ohira, Kazuo, 4,876,345, Cl. 544-379.000.

Ohji, Akihito: *See*—
Mizobuchi, Tadafumi; Ohji, Akihito; Sakoh, Seiichi; and Muguruma, Yasuyoshi, 4,876,092, Cl. 424-435.000.

Ohji, Kenzo: *See*—
Mihara, Makoto; Inoue, Masanobu; Ohji, Kenzo; and Itou, Shuji, 4,875,533, Cl. 177-144.000.

Ohkita, Masao: *See*—
Yunokuchi, Ryu; Omori, Shinichi; and Ohkita, Masao, 4,875,276, Cl. 29-603.000.

Ohkubo, Kazuo; Hayashi, Tadamasa; and Nagai, Hiroshi, to Ebara Corporation. Hollow fiber filter device. 4,876,006, Cl. 210-321.690.

Ohkuma, Taka'aki: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,876,244, Cl. 514-19.000.

Ohlendorf, Dieter: *See*—
Hemmerling, Wolfgang; Dubal, Hans-Rolf; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,876,028, Cl. 252-299.610.

Ohmae, Tsutomu: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Ohno, Kouji: *See*—
Saito, Shinichi; Inoue, Hiromichi; Miyazawa, Kazutoshi; Ohno, Kouji; and Ushioda, Makoto, 4,876,026, Cl. 252-299.610.

Ohoka, Susumu: *See*—
Maeda, Tetsuro; Wada, Fukuaki; Ohoka, Susumu; and Okamoto, Akihiro, 4,876,145, Cl. 428-327.000.

Ohsaki, Takashi: *See*—
Arakawa, Kohei; and Ohsaki, Takashi, 4,876,078, Cl. 423-447.300.

Ohsawa, Hidefumi; Katayama, Akihiro; Hosokawa, Hiroshi; Sunohara, Izuru; and Yoshimoto, Masahiko, to Canon Kabushiki Kaisha. Image processing apparatus with binarization-error dispersal. 4,876,610, Cl. 358-443.000.

Ohshima, Hajime: *See*—
Suzuki, Yasuhito; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, 4,876,562, Cl. 346-160.000.

Ohta, Norio: *See*—
Susa, Kenzo; Takagi, Kazumasa; Kobayashi, Toshio; Takayama, Takanobu; and Ohta, Norio, 4,876,144, Cl. 428-336.000.

Ohta, Saburo: *See*—
Isaka, Tsutomu; and Ohta, Saburo, 4,876,146, Cl. 428-347.000.

Ohta, Tomihisa: *See*—
Nozoe, Shigeo; and Ohta, Tomihisa, 4,876,383, Cl. 560-163.000.

Ohtani, Sumio: *See*—
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.

Oike, Hitoshi; and Yanagimachi, Motoshige, to Oike Industrial Co., Ltd. Heat-sensitive transfer medium. 4,875,961, Cl. 156-234.000.

Oike Industrial Co., Ltd.: *See*—
Oike, Hitoshi; and Yanagimachi, Motoshige, 4,875,961, Cl. 156-234.000.

Oil Dynamics, Inc.: *See*—
Farque, Claude A., 4,876,539, Cl. 340-856.000.

Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, to Eisai Co., Ltd. Piperidine derivative and pharmaceutical composition containing the same. 4,876,262, Cl. 514-318.000.

Oka, Hiroki; and Nagura, Nobuyoshi, to Aisin Seiki Kabushiki Kaisha. Vehicle speed detecting device. 4,876,527, Cl. 340-441.000.

Okada, Kazuo: *See*—
Imai, Hitoshi; Okada, Kazuo; and Tadokoro, Michihiro, 4,876,666, Cl. 365-106.000.

Okamoto, Akihiro: *See*—
Maeda, Tetsuro; Wada, Fukuaki; Ohoka, Susumu; and Okamoto, Akihiro, 4,876,145, Cl. 428-327.000.

Okamoto, Eiji, to NEC Corporation. Key distribution method. 4,876,716, Cl. 380-21.000.

Okamoto, Kenzo; and Kitada, Fumihiko, to Imanishi Kinzoku Kogyo Kabushiki Kaisha. Latch assembly for door or window of microwave range. 4,875,721, Cl. 292-29.000.

Okamoto, Tatsuo: *See*—
Watakabe, Yaichiro; Okamoto, Tatsuo; and Matsuda, Shuichi, 4,876,164, Cl. 430-5.000.

Okamoto, Toshio: *See*—
Iwai, Isamu; Okamoto, Toshio; and Doi, Miwako, 4,876,665, Cl. 364-900.000.
Saito, Mitsuo; Matoba, Tsukasa; and Okamoto, Toshio, 4,876,657, Cl. 364-521.000.

Okamoto, Yuji: *See*—
Suzumura, Hiroyuki; Okamoto, Yuji; and Suezaki, Isao, 4,875,817, Cl. 411-171.000.

Okawa, Tadashi; and Suzuki, Toshio, to Toray Silicone Company, Ltd. Method of manufacturing organopolysiloxane having terminal alkenyl groups. 4,876,373, Cl. 556-453.000.

Okazaki, Masaki: *See*—
Miyasaka, Tsutomu; Okazaki, Masaki; and Sugimoto, Tadao, 4,876,183, Cl. 430-567.000.

Oki Electric Industry Co., Ltd.: *See*—
Ishikawa, Osamu; and Sumiya, Kiyoshi, 4,876,605, Cl. 358-400.000.

Okimoto, Haruo; and Tashima, Seiji, to Mazda Motor Corporation. Supercharging apparatus for an internal combustion engine. 4,875,454, Cl. 123-559.300.

Okuda, Akihiko; Totake, Yukinori; and Matsumura, Hideki, to Denki Kagaku Kogyo Kabushiki Kaisha. Process for producing 2,3 dichlorobutadiene-1,3. 4,876,407, Cl. 570-239.000.

Okuda, Hiroki: *See*—
Mizutani, Masato; Shiroshita, Masao; Sakaki, Masaharu; Okuda, Hiroki; and Mito, Nobuaki, 4,875,924, Cl. 71-92.000.

Okuda, Hiroko; and Takenaka, Makoto, to Casio Computer Co., Ltd. Electronic musical instrument with touch response function. 4,875,400, Cl. 84-626.000.

Okuda, Shozo: *See*—
Inui, Masaki; Okuda, Shozo; and Hosono, Masaki, 4,875,566, Cl. 192-53.00F.

Okuda, Yoshihiko: *See*—
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,876,446, Cl. 250-221.000.

Okuyama, Toshiaki: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Olin Corporation: *See*—
Casberg, John M., 4,876,003, Cl. 210-169.000.
Miller, J. Stanley; and Bowles, Thomas J., 4,876,296, Cl. 523-200.000.

O'Loughlin, Francis A., to Thomas & Betts Corporation. Electrical connector for overlapped conductors. 4,875,876, Cl. 439-431.000.

Olson, Larry D.; and Pallardy, Eugene P., Jr., to Allied-Signal Inc. Polyimide resin from bis-imide, polyphenol and dicyandiamide. 4,876,325, Cl. 528-170.000.

Omni Optical Products, Inc.: *See*—
Panique, Kenneth L.; and Frank, Jeffrey B., 4,875,291, Cl. 33-293.000.

Omori, Shinichi: *See*—
Yunokuchi, Ryu; Omori, Shinichi; and Ohkita, Masao, 4,875,276, Cl. 29-603.000.

Omura, Tadao: *See*—
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.

Onaga, Eimei M.: *See*—
Daggett, Kenneth E.; Onaga, Eimei M.; and Casler, Richard J., Jr., 4,876,494, Cl. 318-568.220.

O'Neill, James F.; Drake, Donald J.; and Hawkins, William G., to Xerox Corporation. Method of fabricating ink jet printheads. 4,875,968, Cl. 156-633.000.

Onishi, Koji: *See*—
Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, 4,875,455, Cl. 123-568.000.

Onnenberg, Volker; and Mollmann, Gunter, to Fritsche-Mollmann GmbH & Co.; and Bayer Aktiengesellschaft. Vacuum mold for manufacturing cushions with back-foamed covers. 4,875,843, Cl. 425-4.00R.

Ono, Koichi: *See*—
Urata, Kaoru; Nakashio, Miaki; Ono, Koichi; Hirai, Hitoshi; and Iwamoto, Masayuki, 4,876,703, Cl. 377-62.000.

Ono, Koji: *See*—
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.

Ono, Toshio: *See*—
Shimodaira, Hisayo; Ono, Toshio; Miyawaki, Keizo; and Hamaguchi, Tatsuya, 4,875,766, Cl. 350-641.000.

Onuki, Toru; Sagawa, Junichi; Watanabe, Tamotsu; and Yoshimitsu, Toshio, to Kabushikikaisha Riken; and Kabushiki Kaisha Komatsu Seisakusho. Piston ring having a wear resistant surface layer. 4,876,158, Cl. 428-565.000.

Ooms, Pieter: *See*—
Heine, Hans-Georg; and Ooms, Pieter, 4,876.393, Cl. 568-415.000.

Orac, Thomas H.; Quandt, Herbert C.; and Ball, David R., to Union Carbide Corporation. Treatment of petroleum cokes to inhibit coke puffing. 4,875,979, Cl. 201-5.000.

Orbach, Zvi; and Janai, Meir I., to Elron Electronic Industries, Ltd. Fabrication of customized integrated circuits. 4,875,971, Cl. 156-644.000.

Oren, David D. Front end loading enclosed semi trailer. 4,875,821, Cl. 414-481.000.

Orsburn, Michael L.; Hemsky, Robert L.; Tucker, Terry L.; Schwarz, Robert E.; and Fearing, Craig F., to Utah Scientific Advanced Development Center, Inc. Phase responsive composite video signal control system. 4,876,589, Cl. 358-22.000.

Ortho Pharmaceutical Corporation: *See*—
Hajos, Zoltan G.; Kanojia, Ramesh M.; and Press, Jeffery B., 4,876,257, Cl. 514-253.000.

Osabe, Kuniji: *See*—
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, 4,875,810, Cl. 406-14.000.

Osaka Yuki Kagakuo Kogyo Kabushiki Kaisha: *See*—
Kato, Chuzo; and Kuroda, Kazuyuki, 4,875,762, Cl. 350-357.000.

Osanai, Hiroyuki: *See*—
Akao, Mutsuo; Osanai, Hiroyuki; and Inoue, Koji, 4,876,125, Cl. 428-35.200.

Osawa, Izumi: *See*—
Hotomi, Hideo; Osawa, Izumi; Iino, Syuji; Doi, Isao; and Fujiwara, Masanori, 4,876,168, Cl. 430-58.000.

Osborne, Robert L., to Westinghouse Electric Corp. Apparatus and method for monitoring steam turbine shroud clearance. 4,876,505, Cl. 324-208.000.

Oshika, Yasuhiro: *See*—
Nakaoku, Shozo; Sakuma, Kazuhiko; Oshika, Yasuhiro; and Ohira, Kazuo, 4,876,345, Cl. 544-379.000.

Oshio, Hideki: *See*—
Kondo, Takeshi; Kawai, Toshikazu; and Oshio, Hideki, 4,876,404, Cl. 570-145.000.

Oshita, Saiichiro; Mouri, Toyohiko; and Takahaski, Tsutomu, to Fuji Jukogyo Kabushiki Kaisha. Electric power steering system. 4,875,540, Cl. 180-79.100.

Oshita, Saiichiro; Mouri, Toyohiko; Takahashi, Tsutomu; and Itou, Shinji, to Fuji Jukogyo Kabushiki Kaisha. Electric power steering system. 4,875,541, Cl. 180-79.100.

Osipov, Gennady I.: *See*—
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.

Osterhout, Ralph F.; Howard, Paul L.; and Light, Greta G., to Tekna, Inc. Flashlight with battery life indicator module. 4,876,632, Cl. 362-183.000.

Ostermeier, Bruce H., to AM International Corporation. Low loss photoplotter imaging system. 4,875,751, Cl. 350-96.180.

Ostertag, Alfred: *See*—
Biehl, Johann; and Ostertag, Alfred, 4,875,531, Cl. 175-250.000.

Ostrup, Heinrich; and Hegger, Josef, to CLAAS OHG. Product receiving arrangement for agricultural machines, especially for self-propelling harvester threshers. 4,875,331, Cl. 56-208.000.

Otera, Junzo; Mandai, Tadakatsu; and Kawada, Mikio, to Kuraray Co., Ltd. Process for producing vitamin A or its carboxylic acid esters, and itermediate compounds useful for the process. 4,876,400, Cl. 568-824.000.

Otis Elevator Company: *See*—
Berkhan, Dietmar; and Mehlert, Martin, 4,875,558, Cl. 188-171.000.
Hermann, Dietrich E.; and Holzhauer, Ralf, 4,875,568, Cl. 198-335.000.

Otomo, Ruyzi: *See*—
Abe, Akira; Nakajima, Junya; Takase, Haruo; Uenaka, Kazushige; and Otomo, Ruyzi, 4,876,180, Cl. 430-393.000.

Ouchi, Akihiko: *See*—
Yabe, Akira; Ouchi, Akihiko; Moriyama, Hiroshi; and Masuda, Etsuro, 4,875,986, Cl. 204-157.600.

Oury, Robert F.; and Gallione, Joseph, to Rotec Industries, Inc. Concrete delivery system. 4,875,569, Cl. 198-36.00D.

Owen, Hartley: *See—*
Haddad, James H.; Owen, Hartley; and Schatz, Klaus W., 4,875,994, Cl. 208-113.000.

Owen, Robert E.; and Miller, Bruce E., to Bipolar Integrated Technology, Inc. Fixed-point multiplier-accumulator architecture. 4,876,660, Cl. 364-754.000.

Owens-Corning Fiberglas Corporation: *See—*
Dallum, Barry J., 4,876,124, Cl. 428-34.500.

Oy Nokia Ab: *See—*
Pessa, Markus; Asonen, Harry; Varrio, Jukka; and Salokatve, Arto, 4,876,218, Cl. 437-107.000.

Oyaizu, Hirotsugu: *See—*
Takagi, Akira; Oyaizu, Hirotsugu; Takahashi, Nobuatsu; and Kume, Kiyotaka, 4,875,647, Cl. 248-74.300.

Oyamada, Akira: *See—*
Tsuchida, Hirofumi; Tanaka, Toshiaki; Oyamada, Akira; and Hirao, Sumio, 4,875,444, Cl. 123-270.000.

Oyamada, Takashi, to NEC Corporation. Pager receiver including a light emitting and a light sensing element adjacent to a translucent portion of a receiver housing. 4,876,537, Cl. 340-825.440.

Ozaki, Hideharu, to NEC Corporation. Logic integrated circuit for scan path system. 4,876,704, Cl. 377-70.000.

Ozaki, Hiroyuki; and Kawata, Ken, to Fuji Photo Film Co., Ltd. Heat-developable light-sensitive material. 4,876,184, Cl. 430-607.000.

Ozawa, Takashi; Tanaka, Hitoshi; Goshima, Takahiro; and Takagi, Kozi, to Nippondenso Co., Ltd. Anti-skid braking control system for use on motor vehicle. 4,875,741, Cl. 303-116.000.

Ozawa, Takashi, to Fuji Xerox Co., Ltd. Contact type image sensor with separate charge transfer device. 4,876,585, Cl. 357-24.000.

Ozawa, Yoshio; Yamamoto, Takashi; Shigaki, Takao; and Kaneko, Rokusaburo, to Fuji Photo Film Co., Ltd. Focusing method for printer. 4,876,568, Cl. 355-56.000.

Ozeki, Takeshi: *See—*
McNeill, Kevin M.; and Ozeki, Takeshi, 4,876,643, Cl. 364-200.000.

Ozen Corporation: *See—*
Koike, Eishi; and Yusa, Yasuhiko, 4,876,678, Cl. 369-31.000.

Paal, Tibor: *See—*
Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela, 4,875,809, Cl. 405-263.000.

Paau, Alan, to Agracetus Corporation. Bacterial agricultural inoculants. 4,875,921, Cl. 71-7.000.

Pace, Laurel J.: *See—*
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.

Pacelli, Leonardo: *See—*
Alota, Santa; Ferrari, Vincenzo; Memmi, Massimo; Pacelli, Leonardo; and Ramundo, Susanna, 4,875,983, Cl. 204-28.000.

Padley, Frederick B.: *See—*
King, David M.; and Padley, Frederick B., 4,876,107, Cl. 426-601.000.

Paice, Derek A., to Westinghouse Electric Corp. Multi-pulse converter system. 4,876,634, Cl. 363-5.000.

Palac, Donald T., heir: *See—*
Palac, Kazimir, deceased; Palac, Judith A., heir; Palac, Donald T., heir; and Palac, Susan M., heir, 4,876,480, Cl. 313-477.00R.

Palac, Judith A., heir: *See—*
Palac, Kazimir, deceased; Palac, Judith A., heir; Palac, Donald T., heir; and Palac, Susan M., heir, 4,876,480, Cl. 313-477.00R.

Palac, Kazimir, deceased (by Palac, Phyllis J., heir); by Palac, Judith A., heir; by Palac, Donald T., heir; and by Palac, Susan M., heir, to Zenith Electronics Corporation. Low-cost, self-polished color CRT flat faceplate. 4,876,480, Cl. 313-477.00R.

Palac, Phyllis J., heir: *See—*
Palac, Kazimir, deceased; Palac, Judith A., heir; Palac, Donald T., heir; and Palac, Susan M., heir, 4,876,480, Cl. 313-477.00R.

Palac, Susan M., heir: *See—*
Palac, Kazimir, deceased; Palac, Judith A., heir; Palac, Donald T., heir; and Palac, Susan M., heir, 4,876,480, Cl. 313-477.00R.

Palanisamy, Thirumalai G.; and Mendelson, Stuart E., to Allied-Signal Inc. Apparatus and method for charging and testing batteries. 4,876,495, Cl. 320-18.000.

Pallardy, Eugene P., Jr.: *See—*
Olson, Larry D.; and Pallardy, Eugene P., Jr., 4,876,325, Cl. 528-170.000.

Palmer, Christopher J.; and Casida, John E., to University of California, The Regents of the. New class of pesticides comprising 1,4-bis-substituted-2,6,7-trioxabicyclo(2.2.2)octanes. 4,876,274, Cl. 514-452.000.

Palmer, Marcia: *See—*
McGuire, Michael; DiGiacomo, Ralph; Palmer, Marcia; and Liggett, Louis, 4,876,104, Cl. 426-57.000.

Palmer, Michael J.: *See—*
Cipolla, Thomas M.; Horton, Raymond R.; Murphy, Philip; and Palmer, Michael J., 4,875,614, Cl. 228-5.500.

Palmer, Paul D., Sr.: *See—*
Kinnebrew, Earl, II; and Palmer, Paul D., Sr., 4,875,348, Cl. 68-200.000.

Panduit Corp.: *See—*
Caveny, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 4,875,881, Cl. 439-535.000.

Panel International Ltd. p.l.c.: *See—*
Tikkanen, Tim, 4,876,008, Cl. 210-498.000.

Panex Corporation: *See—*
Delatorre, Leroy C., 4,875,368, Cl. 73-151.000.
Delatorre, Leroy C., 4,875,369, Cl. 73-151.000.

Pangborn Corporation: *See—*
Long, William W., III, 4,875,309, Cl. 51-419.000.

Panique, Kenneth L.; and Frank, Jeffrey B., to Omni Optical Products, Inc. Rotating reflector prism and target. 4,875,291, Cl. 33-293.000.

Panosh, Richard: *See—*
Rapoport, Uri; and Panosh, Richard, 4,875,486, Cl. 128-653.000.

Paolillo, Michael. Practice putting game. 4,875,682, Cl. 273-176.00F.

Paper Converting Machine GmbH: *See—*
Meyer, Dieter, 4,875,328, Cl. 53-529.000.

Parazzoli, Claudio G.: *See—*
Lucero, David J.; Parazzoli, Claudio G.; and Mangir, Metin S., 4,876,693, Cl. 372-82.000.

Parent, David J.: *See—*
Hodgson, Gordon; Broadhead, Douglas G.; and Parent, David J., 4,875,538, Cl. 180-379.000.

Parimbetova, Roza B.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., to Kolon Industries, Inc. Two-stage process for preparing aromatic polyamide fiber. 4,876,040, Cl. 264-14.000.

Park, John N.; Steigerwald, Robert L.; and Schutten, Michael J., to General Electric Company. Series resonant inverter with lossless snubber-resetting components. 4,876,635, Cl. 363-17.000.

Park, Jong T.: *See—*
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Park, Sa Ng B.: *See—*
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.

Parker, Robert H., to Autokraft Limited. Vehicle drive. 4,875,535, Cl. 180-6.200.

Parker Technology, Inc.: *See—*
Frink, Tommy S.; Reed, Lowell M.; Cochran, Dwayne V.; and McNair, Will L., 4,875,530, Cl. 175-27.000.

Parker, Tim: *See—*
Ray, Robert; Neal, Robert A.; Jaran, John R.; and Parker, Tim, 4,875,581, Cl. 206-328.000.
Tighe, Laurence E.; and Parker, Tim, 4,876,423, Cl. 219-10.55E.

Parkes, Deborah L.: *See—*
Luciw, Paul; Parkes, Deborah L.; and Van Nest, Gary A., 4,876,089, Cl. 424-89.000.

Parlman, Robert M.: *See—*
Dixon, George G.; Parlman, Robert M.; and Stewart, Wayne, 4,876,030, Cl. 252-315.200.

Parmely, Kevin W.; Van Asten, Scot R.; and Stanton, Harbor E. Sonic collar sheep protector. 4,876,674, Cl. 367-139.000.

Parrone, Tony. Condom-holder device. 4,875,491, Cl. 128-844.000.

Partis, Richard A.: *See—*
Koszyk, Francis J.; Partis, Richard A.; and Mueller, Richard A., 4,876,268, Cl. 514-425.000.

Parton, Richard L.: *See—*
Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, 4,876,181, Cl. 430-522.000.

Parulski, Kenneth A., to Eastman Kodak Company. Low resolution verifier for a still video image. 4,876,590, Cl. 358-41.000.

Paschke, Klaus; Crass, Guenther; and Dinter, Peter, to Hoechst Aktiengesellschaft. Process for preparing a transfer metallization film. 4,875,963, Cl. 156-249.000.

Pascouet, Adrien P. External bubble-suppression method and apparatus. 4,875,545, Cl. 181-115.000.

Patch, Keith D.: *See—*
DeSaro, Robert; Doyle, Edward F.; Metcalfe, Christopher I.; and Patch, Keith D., 4,875,919, Cl. 65-27.000.

Patel, Ambelal R.: *See—*
Seltzer, Raymond; Ravichandran, Ramanathan; and Patel, Ambelal R., 4,876,300, Cl. 524-100.000.

Patel, Pravin P.: *See—*
Norwood, Roger D.; Chun, Jino; and Patel, Pravin P., 4,876,671, Cl. 365-233.000.

Patent-Treuhand-Gesellschaft fur elektrische Gluhlampen: *See—*
Stadler, Karl, 4,876,482, Cl. 313-579.000.

Patri, Franz: *See—*
Zehnder, Paul; Niklaus, Hans-Ulrich; Schmiedl, Engelbert; and Patri, Franz, 4,875,836, Cl. 417-360.000.

Patterson, John A., Jr. Pre-tied necktie. 4,875,239, Cl. 2-152.00R.

Patton, Evan: *See—*
Yamaguchi, Tadanori; Patton, Evan; Lane, Eric; and Yu, Simon, 4,876,214, Cl. 437-038.000.

Paulson, Leland E., to United States of America, Energy. Hydrogen production with coal using a pulverization device. 4,876,080, Cl. 423-648.100.

Payet, George L.; and Chang, John C., to Minnesota Mining and Manufacturing Company. Treating fibrous polyamide articles. 4,875,901, Cl. 8-115.560.

PCUK-Produits Chimiques Ugine Kuhlmann: *See—*
Foulletier, Louis, 4,876,406, Cl. 570-165.000.

Peabody Coal Company: *See—*
Evans, Vernon C.; and Heidinger, George H., 4,876,514, Cl. 324-556.000.

Peake, Clinton J., to FMC Corporation. Vinyl fluorides and pesticidal uses. 4,876,285, Cl. 514-746.000.

Peck, Joel S. Apparatus for packaging waste material. 4,875,729, Cl. 294-1.300.

Pedain, Josef: *See*—
Noll, Klaus; Thoma, Wilhelm; Nachtkamp, Klaus; Schroer, Walter; and Pedain, Josef, 4,876,302, Cl. 524-267.000.

Pedrazzi, Reinhard, to Sandoz Ltd. Monoazo compounds containing a 2-sulfophenyl diazo component radical and a 1-hydroxy-naphthalene-sulfonic or disulfonic acid coupling component radical and two substituted 1,3,5-triazine rings. 4,875,903, Cl. 8-640.000.

Pedrazzi, Reinhard, to Sandoz Ltd. Oxazine compounds substituted by one or more basic groups and preparation thereof. 4,876,342, Cl. 544-14.000.

Peerikamp, Erik R.; and Gijsman, Pieter, to Stamicarbon B.V. Polyamide composition. 4,876,301, Cl. 524-255.000.

Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, to Saint-Gobain Vitrage. Adjustable insulating glass window. 4,875,308, Cl. 49-501.000.

Pejakovich, Michael: *See*—
Badger, Ronald L.; and Pejakovich, Michael, 4,875,695, Cl. 280-33.993.

Pence, Jerry W., to International Business Machines Corporation. Optimizing volume mounts in a multidrive environment. 4,876,662, Cl. 364-900.000.

Penn, Richard S.: *See*—
Carlstedt, Kenneth T.; and Penn, Richard S., 4,876,598, Cl. 358-160.000.

Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., to Du Pont de Nemours, E. I., and Company. Benoz-fused cycloalkane trans-1,2-diamine derivatives. 4,876,269, Cl. 514-429.000.

Pennington, Roy E., to Hewlett-Packard Company. Mass interconnect system. 4,875,861, Cl. 439-79.000.

Pennwalt Corporation: *See*—
Gardner, David M.; Wheaton, Gregory A.; and Nosowitz, Martin, 4,876,048, Cl. 260-543.00R.

Penzhorn, Ralf-Dieter; and Yoshida, Hiroshi, to Kernforschungszentrum Karlsruhe GmbH. Process for cleaning the exhaust gas of a fusion reactor. 4,875,945, Cl. 376-146.000.

Per Arvid Emil Carlsson: *See*—
Arvidsson, Folke L. E.; Carlsson, Per A. E.; Hacksell, Uli A.; Hjorth, John S. M.; Johansson, Anette M.; and Lindberg, Per L., 4,876,284, Cl. 514-657.000.

Perkin-Elmer Corporation, The: *See*—
America, William G., 4,876,005, Cl. 210-198.200.

Perkins, Geoffrey W., to Motorola Inc. Frequency tracking system. 4,876,518, Cl. 331-1.00A.

Perko, Louis S., to General Dynamics Corp., Pomona Div. Pressure transfer plate assembly for a heat bonding apparatus. 4,875,966, Cl. 156-580.000.

Perlmutter, Robert J., to Resonex, Inc. Image restoration process for magnetic resonance imaging resonance imaging. 4,876,509, Cl. 324-309.000.

Perma Tubes Ltd.: *See*—
Goodwin, Paul, 4,876,054, Cl. 264-333.000.

Perng, Yeong-Ju: *See*—
Lin, Trong-Goang; Ho, Ling-Wen; Ko, An-Nan; and Perng, Yeong-Ju, 4,876,398, Cl. 568-804.000.

Perrette, Claude: *See*—
D'Hoogue, Martial; Perrette, Claude; and Goffinet, Pierre, 4,875,600, Cl. 222-52.000.

Perrochat, Jean Michel: *See*—
Joseph, Philippe; and Perrochat, Jean Michel, 4,875,706, Cl. 280-708.000.

Perzborn, elisabeth: *See*—
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, 4,876,255, Cl. 514-252.000.

Pessa, Markus; Asonen, Harry; Varrio, Jukka; and Salokatve, Arto, to Oy Nokia Ab. Method of growing GaAs films on Si or GaAs substrates using ale. 4,876,218, Cl. 437-107.000.

Petcavich, Robert J. Tray or pan for baking batter-based food products in microwave ovens. 4,876,428, Cl. 219-10.55E.

Petelet, Georges: *See*—
Climent, Jean-Pierre; Petelet, Georges; and Tronel, Jean-Claude, 4,876,551, Cl. 342-460.000.

Peter, Julius. Method of producing mixtures of rubber or rubber-like material, and carbon black. 4,876,297, Cl. 523-351.000.

Petermann, Steven G.; and Schasteen, Thomas, to Atlantic Richfield Company. Ultrasonic logging tool with rotating exposed transducer. 4,876,672, Cl. 367-35.000.

Peters, Loren W.: *See*—
Turner, Reed J.; Peters, Loren W.; Wilson, John E.; and Bennett, Robert E., 4,875,891, Cl. 460-110.000.

Peters, Michaels S.: *See*—
Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Mathews, Brian; and Peters, Michaels S., 4,875,646, Cl. 244-190.000.

Peters, Willem: *See*—
Verkuylen, Adrianus H. L., 4,875,543, Cl. 180-219.000.

Petersen, Borge; and Groot, William P., to NCR Corporation. Floating idler wheel arm assembly for a document transport. 4,875,670, Cl. 271-265.000.

Peterson, Francis C., to Buell Industries, Inc. Caged fastener. 4,875,816, Cl. 411-104.000.

Pettersen, Frederick A.: *See*—
Hsieh, C. Richard; King, Desmond F.; Pettersen, Frederick A.; and Shargay, Cathleen A., 4,875,996, Cl. 208-157.000.

Peyret, Olivier: *See*—
Delair, Jacques; and Peyret, Olivier, 4,876,705, Cl. 378-144.000.

Pfiester, James R., to Motorola, Inc. Salicided source/drain structure. 4,876,213, Cl. 437-34.000.

Pfizer Inc.: *See*—
Urban, Frank J., 4,876,367, Cl. 549-349.000.

Phaal, Cornelius; and Burnand, Richard P. Thermally stable diamond abrasive compact body. 4,875,907, Cl. 51-293.000.

Phaff, Rox; and Bedekovic, Davor, to Ciba-Geigy Corporation. Chromogenic phthalides and azaphthalides. 4,876,357, Cl. 548-463.000.

Philip Morris Incorporated: *See*—
Wheless, Jack C., 4,875,495, Cl. 131-110.000.

Phillips, Michael R. Underground control housing. 4,876,629, Cl. 361-391.000.

Phillips Petroleum Company: *See*—
Dixon, George G.; Parlman, Robert M.; and Stewart, Wayne, 4,876,030, Cl. 252-315.200.
Ewert, Warren M.; Kubicek, Donald H.; and Drake, Charles A., 4,876,410, Cl. 585-516.000.

Phillips, Ronald W., II, to B. F. Goodrich Company, The. Blind fastener. 4,875,815, Cl. 411-38.000.

Phinney, Richard R.; and Strippe, David C., to International Business Machines Corporation. Process for the self fractionation deposition of a metallic layer on a workpiece. 4,876,114, Cl. 427-45.100.

Piano, Anthony P., to Warner-Lambert Company. Soft chewing gum wrapping machine and method. 4,875,326, Cl. 53-435.000.

Picanol N.V.: *See*—
Moeneclaey, Denis; Coopman, Lucien; and Victoor, Johnny, 4,875,505, Cl. 139-448.000.

Piccirillo, Alessandro, to Magic Stuff, Inc. Fluid resistant coating composition. 4,876,142, Cl. 428-224.000.

Piegay, Yves: *See*—
Movilliat, Pierre A.; Piegay, Yves; and Gardin, Gilles D., 4,875,679, Cl. 273-73.00R.

Pietzsch, Ludwig; Senger, Detlef; Winter, Horst; and Vollinger, Hubert, to IBP Pietzsch Gmbh. Method and device for representing a composite image on a screen of a screen device. 4,876,600, Cl. 358-183.000.

Pigeon, Raymond: *See*—
Autant, Pierre; Cartillier, Andre; and Pigeon, Raymond, 4,876,097, Cl. 426-74.000.

Pillar, Walter O.: *See*—
Belke, Robert E.; Zakraysek, Louis; and Pillar, Walter O., 4,876,120, Cl. 428-1.000.

Pinson, George T., to Boeing Company, The. Multiple axis vibration test platform. 4,875,374, Cl. 73-663.000.

Piotrowski, Andrzej M., and Ligi, Joseph J., to Texas Alkyls, Inc. Deactivation of reactive organometallic contaminated equipment. 4,875,941, Cl. 134-11.000.

Piotrowski, Andrzej M.: *See*—
Malpass, Dennis B.; Triplett, Kelly B.; and Piotrowski, Andrzej M., 4,876,318, Cl. 525-446.000.

Pisarski, Nathan: *See*—
Adams, Lowell J.; Simshauser, Steven C.; Pisarski, Nathan; and Weisend, Norbert A., Jr., 4,875,644, Cl. 244-134.00R.

Pitney Bowes Inc.: *See*—
Gasiunas, Donatas V.; Sette, Paul R.; and Storace, Anthony, 4,875,788, Cl. 400-163.100.
Marzullo, Joseph H., 4,875,965, Cl. 156-442.100.

Plant Cell Research Institute, Inc.: *See*—
Burke, Basil A.; and Nair, Muraleedharan G., 4,876,277, Cl. 514-465.000.

Plitt, Cheryl A.; and Dutcher, James C. Splash guard for outboard motor. 4,875,882, Cl. 440-66.000.

Plueddemann, Edwin P.: *See*—
Witucki, Gerald L.; and Plueddemann, Edwin P., 4,876,154, Cl. 428-447.000.

Podhorsky, Miroslan: *See*—
Krips, Herbert; and Podhorsky, Miroslan, 4,875,270, Cl. 29-421.100.

Podkowa, William J.; and Williams, Clark R., to Dallas Semiconductor Corporation. Dynamic CMOS buffer for low current switching. 4,876,465, Cl. 307-443.000.

Poehlein, Raymond E.; and Reese, Franklin S., to Xerox Corporation. Roll media feed roll system. 4,875,611, Cl. 226-186.000.

Polaroid Corporation: *See*—
Carcia, Peter P.; and Coltman, Judith N., 4,876,566, Cl. 354-436.000.

Polezhaeva, Antonina I.: *See*—
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Policelli, Frederick J., to Hercules Incorporated. End connectors for filament wound tubes. 4,875,717, Cl. 285-149.000.

Poling, Denzil C. Chisel for removing damaged bolts, nuts and screws. 4,875,289, Cl. 30-167.000.

Pollack, Steven: *See*—
Hutchinson, James; Hoffman, Brian; and Pollack, Steven, 4,875,275, Cl. 29-568.000.

Pomian, Ronald J.: *See—*
Calviello, Joseph A.; Bie, Paul R.; and Pomian, Ronald J., 4,876,176, Cl. 430-311.000.

Pontbriand, Duane J.: *See—*
Dennany, Robert D., Jr.; and Pontbriand, Duane J., 4,875,715, Cl. 285-87.000.

Ponticello, Ignazio S.: *See—*
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., 4,876,167, Cl. 430-7.000.

Popp, Joachim: *See—*
Willkop, Franz; Zahring, Gerhard; Rutsch, Robert; Popp, Joachim; and Eberhard, John, 4,875,828, Cl. 415-173.400.

Potochnik, Lawrence M.: *See—*
Fero, Arnold H.; Potochnik, Lawrence M.; Riling, Ronald W.; and Semethy, Kenneth F., 4,876,058, Cl. 376-247.000.

Powell, John W.; and Massa, Ted R., to Kennametal Inc. Method and apparatus for measuring cutting forces of machine tool. 4,875,365, Cl. 73-104.000.

Powerchute Systems International Inc.: *See—*
Flynn, John P. P., 4,875,642, Cl. 244-13.000.

PPG Industries, Inc.: *See—*
Kang, Hyung H., 4,876,152, Cl. 428-447.000.

Prabhudass, Israel. Oral hygiene tool. 4,875,496, Cl. 132-329.000.

Prager, Lee: *See—*
Ide, Mason G.; Lawrence, Noel L. W.; and Prager, Lee, 4,876,436, Cl. 219-370.000.

Precision Mecanique Labinal: *See—*
Leandris, Sergio; and Moly, Jose, 4,875,286, Cl. 29-872.000.

Precision Screen Machines, Inc.: *See—*
Szarka, Sandor, 4,875,268, Cl. 29-283.000.

Premeau, John E.: *See—*
Moe, Rolf; Corriea, David J.; and Premeau, John E., 4,875,824, Cl. 414-751.000.

Press, Jeffery B.: *See—*
Hajos, Zoltan G.; Kanojia, Ramesh M.; and Press, Jeffery B., 4,876,257, Cl. 514-253.000.

Prest, David W.; and Yorke, William J., to Imperial Chemical Industries PLC. Chemical foaming of emulsion explosive compositions. 4,875,951, Cl. 149-109.600.

Prevent Products, Inc.: *See—*
Garcia, Mario C., 4,875,476, Cl. 128-157.000.

Primary Delivery Systems, Inc.: *See—*
Weinstein, Jack, 4,875,603, Cl. 222-205.000.

Prime Computer, Inc.: *See—*
Ardini, Joseph L.; Lefsky, Brian; and Farr, Barbara J., 4,876,501, Cl. 324-73.00R.

Printronix, Inc.: *See—*
Condon, David C.; and Stumfall, David M., 4,875,409, Cl. 101-93.290.

Procedes Vernet: *See—*
Cook, Andre; and Chamot, Jean P., 4,875,437, Cl. 123-411.000.

Procter & Gamble Company, The: *See—*
Clauss, Allen D.; and Gosselink, Eugene P., 4,876,046, Cl. 8-111.000.
Dickenson, Haydn G. W.; and Huntington, David H., 4,876,023, Cl. 252-90.000.
Feeney, Robert D.; Prosise, Robert L.; McGrady, Joseph; and Niehoff, Raymond L., 4,876,102, Cl. 426-550.000.
Rich, Thomas F., 4,875,974, Cl. 162-10.000.
Snyder, Stephen W.; Monsell, Craig C.; and Puckett, Carol S., 4,875,575, Cl. 206-0.500.

Prodty Engenharia E Comercio Ltda: *See—*
Monteiro, Luciano T. S., 4,875,931, Cl. 72-405.000.

Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, to Eastman Kodak Company. Photographic elements containing infrared filter dyes. 4,876,181, Cl. 430-522.000.

Prosise, Robert L.: *See—*
Feeney, Robert D.; Prosise, Robert L.; McGrady, Joseph; and Niehoff, Raymond L., 4,876,102, Cl. 426-550.000.

Prugh, John D.: *See—*
Hartman, George D.; and Prugh, John D., 4,876,271, Cl. 514-443.000.

Pryor, Timothy R., to Diffracto Ltd. Electro-optical inspection. 4,875,776, Cl. 356-372.000.

Public Health Laboratory Service Board: *See—*
Blake, Barry C.; and Clarke, David J., 4,876,504, Cl. 324-204.000.

Publishers Equipment Corporation: *See—*
Hermach, Carl J., 4,875,936, Cl. 101-218.000.

Puchammer, Julius: *See—*
Rao, Ram A.; Kofod, Mogens; Puchammer, Julius; and Galiotti, George, 4,875,754, Cl. 350-96.200.

Puckett, Carol S.: *See—*
Snyder, Stephen W.; Monsell, Craig C.; and Puckett, Carol S., 4,875,575, Cl. 206-0.500.

Pulsotronic Merten GmbH & Co. KG: *See—*
Dondorf, Wolfgang, 4,876,531, Cl. 340-686.000.

Quabeck, Helmut: *See—*
Fischer, Gerhard; and Quabeck, Helmut, 4,876,611, Cl. 358-456.000.

Quackenbush, John, to FBK International Corporation. Laminate conducting plastic. 4,876,140, Cl. 428-216.000.

Quad Research, Inc.: *See—*
MacGregor, Francis W., 4,875,246, Cl. 15-98.000.

Qualcomm, Inc.: *See—*
Tubbs, Duane G., 4,876,554, Cl. 343-780.000.

Quandt, Herbert C.: *See—*
Orac, Thomas H.; Quandt, Herbert C.; and Ball, David R., 4,875,979, Cl. 201-5.000.

Quella, Ferdinand: *See—*
Budde, Klaus; Koch, Friedrich; and Quella, Ferdinand, 4,876,322, Cl. 526-242.000.

Quiroz, Roberto. Intravaginal device. 4,875,490, Cl. 128-830.000.

R.E.IN. S.p.A.: *See—*
Rozzi, Costantino, 4,875,322, Cl. 52-746.000.

R. P. M. Industries: *See—*
Lulich, John F., 4,875,551, Cl. 184-6.300.

Racz, Daniel: *See—*
Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela, 4,875,809, Cl. 405-263.000.

Radford, David J., to Tongaat-Hulett Group Limited, The. Massecuite supersaturation monitor. 4,875,940, Cl. 127-2.000.

Radisson, Joel; and Braye, Emile, to Sanofi. Process for the preparation of thienylethylamines. 4,876,362, Cl. 549-59.000.

Raether, Wolfgang: *See—*
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.

Rafanelli, Gerard L.: *See—*
Zwirn, Robert; and Rafanelli, Gerard L., 4,876,602, Cl. 358-227.000.

Raistrick, Ian D., to United States of America, Energy. Electrode assembly for use in a solid polymer electrolyte fuel cell. 4,876,115, Cl. 427-115.000.

Rajadhyaksha, Vithal J. Compositions and method comprising heterocyclic compounds containing two heteroatoms. 4,876,249, Cl. 514-174.000.

Rajagopalan, Parthasarathi: *See—*
Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., 4,876,269, Cl. 514-429.000.

Rajsigl, Zdenek; and Kriz, Frantisek, to Zavody na vyrobu lozisk, Povazska Bystrica. Spindle construction for mounting arrangements for spinning machine rotors. 4,875,334, Cl. 57-406.000.

Ramharack, Roopram, to Minnesota Mining and Manufacturing Company. Magnetic recording media and a method using a stable fluid reactive dispersion in preparing magnetic recording media. 4,876,149, Cl. 428-425.900.

Ramot University Authority for Applied Research and Industrial Development Ltd.: *See—*
Hollander, Zeev; Salomon, Beka; and Katchalski-Katzir, Ephraim, 4,876,191, Cl. 435-7.000.

Ramsey, James W.: *See—*
Liu, Benjamin Y. H.; and Ramsey, James W., 4,875,340, Cl. 62-50.200.

Ramundo, Susanna: *See—*
Alota, Santa; Ferrari, Vincenzo; Memmi, Massimo; Pacelli, Leonardo; and Ramundo, Susanna, 4,875,983, Cl. 204-28.000.

Rando, Joseph F.; and Blumer, Eric W., to Spectra-Physics, Inc. Ion laser. 4,876,691, Cl. 372-65.000.

Ranzau, Cheryl L.: *See—*
Mitchell, Debra J.; and Ranzau, Cheryl L., 4,875,492, Cl. 128-890.000.

Rao, Ram A.; Kofod, Mogens; Puchammer, Julius; and Galiotti, George, to Minnesota Mining and Manufacturing Company. Optical fiber connector. 4,875,754, Cl. 350-96.200.

Rao, Srinivas T.: *See—*
Hsu, Kevin; Rao, Srinivas T.; and Kaukeinen, Joseph Y., 4,875,969, Cl. 156-633.000.

Rapoport, Uri; and Panosh, Richard, to Advanced Techtronics, Inc. Instrument and method for non-invasive in vivo testing for body fluid constituents. 4,875,486, Cl. 128-653.000.

Raska, Jack C. Paint mixing paint container. 4,875,781, Cl. 366-130.000.

Rasmussen, Neil S.; Szema, Li-Chieh; and Abuaf, Nesim, to General Electric Company. Combustion chamber liner insert. 4,875,339, Cl. 60-757.000.

Rasmussen, Richard R.: *See—*
Davis, Craig M.; and Rasmussen, Richard R., 4,876,519, Cl. 331-57.000.

Ratcliffe, Charles T.; and Ward, John W., to Union Oil Company of California. Alkylation process using a catalyst having an increased selectivity for monoalkylation. 4,876,408, Cl. 585-467.000.

Ratcliffe, Norman M.: *See—*
Smith, Gilbert W.; Daniel, Mervyn F.; Barton, John W.; and Ratcliffe, Norman M., 4,876,150, Cl. 428-411.100.

Rath, Alfred: *See—*
Waschke, Christine; Topfer, Lothar; and Rath, Alfred, 4,875,477, Cl. 128-206.210.

Ratton, Serge: *See—*
LeBlanc, Jean-Claude; and Ratton, Serge, 4,876,396, Cl. 568-779.000.

Rauleder, Hartwig; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, to Huels Troisdorf AG. Method and apparatus for the preparation of cyanoalkyl-alkoxysilanes. 4,876,337, Cl. 556-415.000.

Rausch, Walter: *See—*
Herding, Walter; and Rausch, Walter, 4,876,288, Cl. 521-53.000.

Ravetta, Guido, to I.PI.CI. S.p.A. Method for the purification of trifluraline. 4,876,388, Cl. 564-437.000.

Ravichandran, Ramanathan: *See—*
Seltzer, Raymond; Ravichandran, Ramanathan; and Patel, Ambelal R., 4,876,300, Cl. 524-100.000.
Ray, Robert; Neal, Robert A.; Jaran, John R.; and Parker, Tim, to Ray, Robert B.; and Neal, Robert A. Static dissipative elastomeric coating for electronic packaging components. 4,875,581, Cl. 206-328.000.
Ray, Robert B.: *See—*
Ray, Robert; Neal, Robert A.; Jaran, John R.; and Parker, Tim, 4,875,581, Cl. 206-328.000.
Raychem Corporation: *See—*
Kamath, Hundi P.; and Leder, Jeffrey C., 4,876,440, Cl. 219-548.000.
Mehan, Ashok K.; and Lunk, Hans E., 4,876,116, Cl. 427-118.000.
Raychem Limited: *See—*
Hardy, Judy; and Wallington, Kenneth, 4,875,870, Cl. 439-204.000.
Raymond, Andre L.: *See—*
Roy, Bernard J. J.; O'Connor, Lorne D.; Rioux, Philippe F.; Dingle, Donald A.; and Raymond, Andre L., 4,876,597, Cl. 358-141.000.
Readman, John, to Sundstrand Corporation. Pitot pump assembly for a rotating fluid management device. 4,875,826, Cl. 415-89.000.
Reason, John R.: *See—*
Brandemuehl, Michael J.; and Reason, John R., 4,875,341, Cl. 62-115.000.
Recktenwald, Diether J., to Becton Dickinson & Company. Peridininchlorophyll complex as fluorescent label. 4,876,190, Cl. 435-7.000.
Recycling Systems, Inc.: *See—*
Bardos, Gary M., 4,875,631, Cl. 241-92.000.
Reed, Carl G., to AMP Incorporated. Electrical device having improved leads for surface mounting on a circuit board. 4,875,863, Cl. 439-79.000.
Reed, John D.; Roberts, Teddy P.; and Berger, Thomas R., to Motorola, Inc. Method and apparatus for cordless microphone communication system. 4,876,710, Cl. 379-63.000.
Reed, Lowell M.: *See—*
Frink, Tommy S.; Reed, Lowell M.; Cochran, Dwayne V.; and McNair, Will L., 4,875,530, Cl. 175-27.000.
Reed, William C.: *See—*
Mullin, Francis J.; and Reed, William C., 4,875,952, Cl. 156-48.000.
Reese, Franklin S.: *See—*
Poehlein, Raymond E.; and Reese, Franklin S., 4,875,611, Cl. 226-186.000.
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, to Bayer Aktiengesellschaft. Substituted azolylcyclopropyl-azolylmethyl-carbinol derivatives. 4,875,928, Cl. 71-92.000.
Reichert, Dietrich. Antisnoring agent. 4,876,283, Cl. 514-562.000.
Reichhold Chemicals, Inc.: *See—*
Durney, Cronin Rebecca L.; Rutherford W. Scott; and Campbell, James F., 4,876,293, Cl. 523-122.000.
Reichner, Philip, to Westinghouse Electric Corp. Generator configuration for solid oxide fuel cells. 4,876,163, Cl. 429-30.000.
Reinbold, Heinz. Spinning apparatus. 4,875,846, Cl. 425-186.000.
Reinecke, Paul: *See—*
Regel, Erik; Bockmann, Klaus; Buchel, Karl H.; Lurssen, Klaus; Brandes, Wilhelm; Konze, Jorg; and Reinecke, Paul, 4,875,928, Cl. 71-92.000.
Reinicke, Ralf: *See—*
Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, 4,875,308, Cl. 49-501.000.
Reinwall, Ernest W., to Elco Industries, Inc. Screw having a sealing washer. 4,875,818, Cl. 411-369.000.
Reithel, Sibylle L.: *See—*
Wake, Ronald W.; Reithel, Sibylle L.; and McGuckin, Hugh G., 4,876,166, Cl. 430-7.000.
Reliance Comm/Tec Corporation: *See—*
Dara, Prithipal, 4,876,630, Cl. 361-413.000.
Kaczmarek, Richard, 4,876,626, Cl. 361-119.000.
Rust, Wayne; and Gilberts, Alexander G., 4,876,621, Cl. 361-58.000.
Reliance Electric Company: *See—*
DeWachter, Gary, 4,875,786, Cl. 384-482.000.
Relyea, Keith E.: *See—*
Chang, Robert W. H.; and Relyea, Keith E., 4,876,136, Cl. 428-130.000.
Remenicky, Joseph M.: *See—*
Evans, Walter R.; Remenicky, Joseph M.; Jasper, Thomas E.; and Ballard, Wayne W., 4,875,351, Cl. 70-271.000.
Rendall, John S., to Solv-Ex Corporation. Hot water bitumen extraction process. 4,875,998, Cl. 208-390.000.
Research Corporation Technologies, Inc.: *See—*
Holton, Robert A.; Juo, Rouh-Rong; and Lowenthal, Richard, 4,876,399, Cl. 568-817.000.
Research Development Corp. of Japan: *See—*
Murakami, Mutsuaki, 4,876,077, Cl. 423-448.000.
Resonex, Inc.: *See—*
Perlmutter, Robert J., 4,876,509, Cl. 324-309.000.
Restle, Serge: *See—*
Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, 4,876,381, Cl. 560-56.000.
Rexroad, John: *See—*
Denny, David S.; Metzger, Edward C. R.; Rexroad, John; and Glynn, William, 4,875,549, Cl. 182-138.000.
Reynolds, Richard W.: *See—*
Stroze, Mark S.; and Reynolds, Richard W., 4,875,403, Cl. 91-482.000.
Rheinmetall GmbH: *See—*
Metz, Josef, 4,875,402, Cl. 89-43.010.
Rhema Enterprises, Inc.: *See—*
Kinnebrew, Earl, II; and Palmer, Paul D., Sr., 4,875,348, Cl. 68-200.000.
Rhim, Moo S.: *See—*
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.
Rhone-Poulenc Chimie: *See—*
Vivant, Gilbert, 4,876,290, Cl. 521-76.000.
Rhone-Poulenc Sante: *See—*
Autant, Pierre; Cartillier, Andre; and Pigeon, Raymond, 4,876,097, Cl. 426-74.000.
Duhamel, Lucette; and Duhamel, Pierre, 4,876,370, Cl. 549-455.000.
Rhone-Poulenc Specialistes Chimiques: *See—*
Desbois, Michael; and Disdier, Camille, 4,876,376, Cl. 558-412.000.
Rhone-Poulenc Specialites Chimiques: *See—*
LeBlanc, Jean-Claude; and Ratton, Serge, 4,876,396, Cl. 568-779.000.
Rich, Marc A., to Teradyne, Inc. Failure information processing in automatic memory tester. 4,876,685, Cl. 371-21.600.
Rich, Thomas F., to Procter & Gamble Company, The. Absorbent vegetable material and process for making same. 4,875,974, Cl. 162-10.000.
Richardson, Hubert, Jr., to Tecumseh Products Company. Scroll compressor with orbiting scroll member biased by oil pressure. 4,875,838, Cl. 418-55.000.
Richardson, Hubert, Jr.: *See—*
Johnson, William C.; Richardson, Hubert, Jr.; and Barito, Thomas R., 4,875,840, Cl. 418-55.000.
Richerson, James D.: *See—*
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.
Richeson, William E.; and Erickson, Frederick L., to Magnavox Government and Industrial Electronics Company. Enhanced efficiency valve actuator. 4,875,441, Cl. 123-90.130.
Ricoh Company, Ltd.: *See—*
Banno, Masahiko; and Nakazato, Yasushi, 4,876,606, Cl. 358-434.000.
Misawa, Shigeyoshi; and Funato, Hiroyoshi, 4,876,680, Cl. 369-110.000.
Nagatsuna, Shinji, 4,876,572, Cl. 355-210.000.
Nakamura, Yoko; Kojima, Fumiyo; and Yoshino, Hirobumi, 4,876,571, Cl. 355-210.000.
Ogura, Masaaki, 4,876,609, Cl. 358-443.000.
Riddle, Dana. Waste treatment cleaner apparatus. 4,876,010, Cl. 210-525.000.
Ries, Gunter: *See—*
Siebold, Horst; and Ries, Gunter, 4,876,510, Cl. 324-318.000.
Riffle, Rob G.: *See—*
Campbell, Michael L.; Williams, Benjamin G.; Riffle, Rob G.; and Biggerstaff, Charles E., 4,876,051, Cl. 264-127.000.
Riisgaard, Steen: *See—*
Enomoto, Michiyo; and Riisgaard, Steen, 4,876,024, Cl. 252-174.120.
Riling, Ronald W.: *See—*
Fero, Arnold H.; Potochnik, Lawrence M.; Riling, Ronald W.; and Semethy, Kenneth F., 4,876,058, Cl. 376-247.000.
Rilly, Gerard; and Rodriguez, Jose-Ignacio, to Deutsche Thomson-Brandt GmbH. Switching power supply having an emergency mode regulating voltage on the primary side. 4,876,636, Cl. 363-21.000.
Rinaldi, Mark A.: *See—*
Nuechterlein, David W.; and Rinaldi, Mark A., 4,876,644, Cl. 364-200.000.
Rinehart, Verne R., to Goodyear Tire & Rubber Company, The. Solid state polymerization of polyester prepolymers. 4,876,326, Cl. 528-272.000.
Rinke, Monika: *See—*
Gusten, Hans; Ache, Hans-Joachim; Rinke, Monika; and Wirth, Hermann O., 4,876,029, Cl. 252-301.170.
Rioux, Philippe F.: *See—*
Roy, Bernard J. J.; O'Connor, Lorne D.; Rioux, Philippe F.; Dingle, Donald A.; and Raymond, Andre L., 4,876,597, Cl. 358-141.000.
Ritter, Gebhard: *See—*
Comte, Pierre-Andre ; Schurch, Hans; and Ritter, Gebhard, 4,875,475, Cl. 128-924.00Y.
Rivera, Raymond R.; VanVleet, Stephen B.; and Wilson, Shari J., to Minnesota Mining and Manufacturing Company. Tamper indicating tape and delaminating film therefore. 4,876,123, Cl. 428-34.200.
Robbins, W. Dale: *See—*
Leone, David A.; Buxton, Clifford A.; and Robbins, W. Dale, 4,876,424, Cl. 200-306.000.
Roberts, Dennis: *See—*
Kopp, Clinton V.; Roberts, Dennis; Biltoft, Bruce G.; and White, Victor, 4,876,012, Cl. 210-644.000.
Roberts, Gary F.; and Meeker, Rick A., to Kartridg Pak Co., The. Nozzle for dispensing increments of flowable product. 4,875,601, Cl. 222-145.000.

Roberts, Teddy P.: *See—*
Reed, John D.; Roberts, Teddy P.; and Berger, Thomas R., 4,876,710, Cl. 379-63.000.
Robertshaw Controls Company: *See—*
McIntosh, Harold A., 4,875,278, Cl. 29-622.000.
Robertson, David W.; and Wong, David T., to Eli Lilly and Company. 1-Phenylalkylamines as selective serotonin uptake inhibitors. 4,876,282, Cl. 514-554.000.
Robertson, John G.: *See—*
Duck, Peter; Bender, Robert; Crosby, William; and Robertson, John G., 4,876,187, Cl. 435-6.000.
Robertson, Robert A., to Spirax Sarco Limited. Flowmeters. 4,875,377, Cl. 73-861.020.
Robinson, Colin; Eastlick, David T.; and Bownass, Audrey J., to Glaxo Group Limited. Process for the separation of a mixture of "syn" and "anti" oxime isomers. 4,876,351, Cl. 548-204.000.
Rock, Erich; and Brustle, Klaus, to Julius Blum Gesellschaft m.b.H. Drawer assembly. 4,875,746, Cl. 312-330.100.
Rockel, Manfred; Wallis, Ernst; Kohler, Michael; Heubner, Ulrich; and Kirchheiner, Rolf, to VDM Nickel-Technologie Aktiengesellschaft. Corrosion-resisting Fe-Ni-Cr alloy. 4,876,065, Cl. 420-582.000.
Rockenfeller, Uwe. Method and apparatus for transferring energy and mass. 4,875,915, Cl. 62-4.000.
Rockwell International Corporation: *See—*
Linebarger, Randolph S., 4,875,769, Cl. 356-28.000.
Nelson, Blaine J., 4,876,699, Cl. 375-82.000.
Rodriguez, Jose-Ignacio: *See—*
Rilly, Gerard; and Rodriguez, Jose-Ignacio, 4,876,636, Cl. 363-21.000.
Rogers, Lloyd W., Jr.: *See—*
Compeau, David E.; Manuel, Mark; and Rogers, Lloyd W., Jr., 4,875,723, Cl. 292-201.000.
Rogers, Max W.; and Skinner, Daniel R., to Dynascan Corporation. Antenna for cordless telephone system. 4,876,709, Cl. 379-61.000.
Rogers, Milton: *See—*
Rogers, Philip L.; and Rogers, Milton, 4,875,770, Cl. 356-28.500.
Rogers, Philip L.; and Rogers, Milton, to Lockheed Corporation. Wind shear detector. 4,875,770, Cl. 356-28.500.
Rohm GmbH Chemische Fabrik: *See—*
Hennig, Jurgen; Vetter, Heinz; and Munzer, Manfred, 4,876,311, Cl. 525-229.000.
Rohm and Haas Company: *See—*
Lorah, Dennis P., 4,876,313, Cl. 525-281.000.
Rohner, Nicholas J. Roofing shingles. 4,875,321, Cl. 52-553.000.
Rohrer, Gene D.: *See—*
Martin, William C.; and Rohrer, Gene D., 4,876,735, Cl. 382-57.000.
Rohs, Ulrich; and Meuter, Herbert. Apparatus for measuring the torque of an operating shaft. 4,875,379, Cl. 73-862.340.
Rokach, Joshua: *See—*
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, 4,876,246, Cl. 514-80.000.
Roland Racine: *See—*
Guarnori, Manuel, 4,875,648, Cl. 248-125.000.
Romano, James, to Con-Tech Industries, Inc. Flapper actuated pilot valve. 4,875,502, Cl. 137-627.500.
Romar Technologies, Inc.: *See—*
Harris, Rano J., Jr., 4,875,427, Cl. 114-219.000.
Romeo, Roch. Tooth-paste with brushing time indicator. 4,876,082, Cl. 424-7.100.
Romm, Michael: *See—*
Welch, Glenn S.; Fidrych, Stephen; Romm, Michael; and Maurer, Bernie J., 4,875,880, Cl. 439-536.000.
Ronne, William M.: *See—*
Garnatz, Anthony H.; and Ronne, William M., 4,875,537, Cl. 180-69.100.
Rooney, Clarence S.: *See—*
Hoffman, William F.; Lee, Ta J.; Smith, Robert L.; and Rooney, Clarence S., 4,876,366, Cl. 514-570.000.
Lee, Ta J.; Hoffman, William F.; and Rooney, Clarence S., 4,876,279, Cl. 514-510.000.
Roschina, Lidia F.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.
Rose, Ira M.: *See—*
Higbie, Francis A.; LieBerman, Robert A.; and Rose, Ira M., 4,876,384, Cl. 560-224.000.
Rosenberg, Harvey J.: *See—*
Solomon, Ruth; and Rosenberg, Harvey J., 4,875,238, Cl. 2-115.000.
Rosenberg, Steven: *See—*
Burke, Rae Lyn; Rosenberg, Steven; Shuster, Jeffrey R.; Tekamp-Olson, Patricia A.; and Valenzuela, Pablo D. T., 4,876,197, Cl. 435-172.300.
Rosentreter, Ulrich: *See—*
Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, 4,876,255, Cl. 514-252.000.
Ross, Randall R.; Bjornard, Eric; and Strand, David, to Energy Conversion Devices, Inc. Data storage device having a phase change memory medium reversible by direct overwrite. 4,876,667, Cl. 365-113.000.
Ross, Stephen T.: *See—*
Kruse, Lawrence I.; Leonard, Thomas B.; and Ross, Stephen T., 4,876,266, Cl. 514-392.000.
Rotec Industries, Inc.: *See—*
Oury, Robert F.; and Gallione, Joseph, 4,875,569, Cl. 198-36.00D.
Roth, Scott D., to Adept Technology, Inc. Vision system for distinguishing touching parts. 4,876,728, Cl. 382-21.000.
Rothe, Anselm: *See—*
Deneke, Ulfert; Nagel, Rolf; Rothe, Anselm; and Freitag, Helmut, 4,876,067, Cl. 422-56.000.
Rotter, Leah D.: *See—*
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.
Roy, Bernard J. J.; O'Connor, Lorne D.; Rioux, Philippe F.; Dingle, Donald A.; and Raymond, Andre L., to ADT Security Systems, Inc. Video observation systems. 4,876,597, Cl. 358-141.000.
Roydhouse, Richard H., to EPS Environmental Protection Systems Limited. Composition to absorb mercury. 4,876,025, Cl. 252-182.320.
Rozzi, Costantino, to R.E.IN. S.p.A. Process for the insulation of existing building facades and prefabricated panel to be used in applying said process. 4,875,322, Cl. 52-746.000.
Rudy, Norman A.; and Tomlin, James S., to Design Systems, Inc. Method and apparatus for automatically cutting food products to predetermined weight or shape. 4,875,254, Cl. 17-61.000.
Ruhnke, Jeffrey P.: *See—*
Widmer, Steven L.; Neisen, Gerald F.; Ruhnke, Jeffrey P.; Steffes, Thomas J.; and Buchholz, Brian S., 4,875,439, Cl. 123-541.000.
Ruiz, Samantha L. Combination pick-up truck bed liner and camper top. 4,875,731, Cl. 296-37.200.
Rullo, James J., to Buckingham Manufacturing Company, Inc. Gaff. 4,875,550, Cl. 182-221.000.
Rust, Wayne; and Gilberts, Alexander G., to Reliance Comm/Tec Corporation. Line protector for a communications circuit. 4,876,621, Cl. 361-58.000.
Rutherford W. Scott: *See—*
Durney, Cronin Rebecca L.; Rutherford W. Scott; and Campbell, James F., 4,876,293, Cl. 523-122.000.
Rutsch, Robert: *See—*
Willkop, Franz; Zahring, Gerhard; Rutsch, Robert; Popp, Joachim; and Eberhard, John, 4,875,828, Cl. 415-173.400.
Ryback, George: *See—*
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,876,200, Cl. 435-253.300.
S.A.M.M. - Societe d'Applications des Machines Motrices: *See—*
Joseph, Philippe; and Perrochat, Jean Michel, 4,875,706, Cl. 280-708.000.
S. C. Johnson & Son, Inc.: *See—*
Buhler, James E.; Crapser, James R.; Miller, Allen D.; and Wefler, Mark E., 4,875,626, Cl. 239-314.000.
Sabatura, Gail J. Highly versatile comprehensive nutritional composition. 4,876,106, Cl. 426-583.000.
Sabia, Raffaele A.: *See—*
Chapin, John T.; and Sabia, Raffaele A., 4,876,303, Cl. 524-296.000.
Sachse, Burkhard: *See—*
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, to NEC Corporation; Nippon Telegraph and Telephone Corp.; and Kabushiki Kaisha Toshiba. Cordless telephone system. 4,876,708, Cl. 379-61.000.
Saeki, Keiso; Sano, Shojiro; Matsuoka, Katsumi; Takashima, Masanobu; and Iwakura, Ken, to Fuji Photo Film Co., Ltd. Recording material. 4,876,233, Cl. 503-209.000.
Saeki, Makoto: *See—*
Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, 4,876,669, Cl. 365-189.010.
Saga Sanyo Industry Co., Ltd.: *See—*
Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, 4,876,451, Cl. 361-540.000.
Sagawa, Junichi: *See—*
Onuki, Toru; Sagawa, Junichi; Watanabe, Tamotsu; and Yoshimitsu, Toshio, 4,876,158, Cl. 428-565.000.
Saint-Gobain Vitrage: *See—*
Canaud, Michel; and Dewitte, Philippe, 4,875,833, Cl. 417-259.000.
Kunert, Heinz, 4,876,132, Cl. 428-43.000.
Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, 4,875,308, Cl. 49-501.000.
Saito, Mitsuo; Matoba, Tsukasa; and Okamoto, Toshio, to Kabushiki Kaisha Toshiba. Presentation display apparatus for displaying two different images on separate displays for a listener and a speaker. 4,876,657, Cl. 364-521.000.
Saito, Mitsuru: *See—*
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.
Saito, Shigeki: *See—*
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yama-

shita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.
Saito, Shinichi; Inoue, Hiromichi; Miyazawa, Kazutoshi; Ohno, Kouji; and Ushioda, Makoto, to Chisso Corporation. Optically active-2-methylbutyrate and materials using the same. 4,876,026, Cl. 252-299.610.
Saitoh, Tatsuo: *See*—
Mizutani, Futoshi; Kyogoku, Takeshi; Saitoh, Tatsuo; and Endoh, Shigeki, 4,875,918, Cl. 65-3.120.
Saitoh, Yoshiro; and Tatsumi, Takashi, to Ciba-Geigy Corporation. Laminated panel having a stainless steel foil core and a process for producing the panel. 4,876,134, Cl. 428-73.000.
Sakabe, Akira: *See*—
Kashima, Takayuki; Sakabe, Akira; and Yamanaka, Yoshifumi, 4,876,433, Cl. 219-130.510.
Sakabe, Yukio: *See*—
Kittaka, Toshihiko; Ando, Akira; and Sakabe, Yukio, 4,876,476, Cl. 310-320.000.
Sakaguchi, Yoshikazu: *See*—
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.
Sakai, Mari: *See*—
Kikukawa, Hiroyasu; Shimoda, Eiji; Sakai, Mari; and Kitada, Fumiko, 4,875,908, Cl. 55-16.000.
Sakai, Masato: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.
Sakaki, Masaharu: *See*—
Mizutani, Masato; Shiroshita, Masao; Sakaki, Masaharu; Okuda, Hiroki; and Mito, Nobuaki, 4,875,924, Cl. 71-92.000.
Sakamoto, Kiichiro: *See*—
Yamaguchi, Kiyoshi; Endo, Azuchi; and Sakamoto, Kiichiro, 4,876,567, Cl. 355-20.000.
Sakamoto, Yukio; Tanabe, Takeshi; Fukutani, Iwao; and Hori, Toshio, to Murata Manufacturing Co., Ltd. Surface mountable connector. 4,875,862, Cl. 439-79.000.
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, to Kabushiki Kaisha Toshiba. Scroll member for use in a positive displacement device, and a method for manufacturing the same. 4,875,839, Cl. 418-55.000.
Sakiadis, Byron C., to Du Pont de Nemours, E. I., and Company. Die attach pickup tools. 4,875,279, Cl. 29-740.000.
Sakoh, Seiichi: *See*—
Mizobuchi, Tadafumi; Ohji, Akihito; Sakoh, Seiichi; and Muguruma, Yasuyoshi, 4,876,092, Cl. 424-435.000.
Sakuma, Kazuhiko: *See*—
Nakaoku, Shozo; Sakuma, Kazuhiko; Oshika, Yasuhiro; and Ohira, Kazuo, 4,876,345, Cl. 544-379.000.
Sakurai, Hidetoshi: *See*—
Kiuchi, Takeo; and Sakurai, Hidetoshi, 4,875,447, Cl. 123-339.000.
Salokatve, Arto: *See*—
Pessa, Markus; Asonen, Harry; Varrio, Jukka; and Salokatve, Arto, 4,876,218, Cl. 437-107.000.
Salomon, Beka: *See*—
Hollander, Zeev; Salomon, Beka; and Katchalski-Katzir, Ephraim, 4,876,191, Cl. 435-7.000.
Salomon S. A.: *See*—
Mabboux, Michel; De Marchi, Jean-Louis; and Legon, Fabrice, 4,875,299, Cl. 36-117.000.
Salzbrunn, Wolfgang; Steiner, Eva; Wohrer, Wilfried; and Meixner, Otto, to Vogelbusch Gesellschaft m.b.H. Method of continuously producing ethanol from sugar-containing substrates. 4,876,196, Cl. 435-161.000.
Samuel, James E.: *See*—
Frazier, Marvin E.; Mallavia, Louis P.; Baca, Oswald G.; and Samuel, James E., 4,876,186, Cl. 435-6.000.
Sanden Corporation: *See*—
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,875,834, Cl. 417-269.000.
Ikeda, Susumu, 4,875,342, Cl. 62-115.000.
Sanderson, Arthur C.; Weiss, Lee E.; and Nayar, Shree K., to Westinghouse Electric Corp. Fiber optic solder joint inspection system. 4,876,455, Cl. 250-560.000.
Sandoz Ltd.: *See*—
Avar, Lajos, 4,876,299, Cl. 524-99.000.
Pedrazzi, Reinhard, 4,875,903, Cl. 8-640.000.
Pedrazzi, Reinhard, 4,876,342, Cl. 544-14.000.
Sandoz Pharm. Corp.: *See*—
Damon, Robert E., II, 4,876,280, Cl. 514-510.000.
Sanduja, Mohan L.: *See*—
Lee, Andrew J.; Sanduja, Mohan L.; Sugathan, Kenneth; Dragnea, Felicia; and Horowitz, Carl, 4,875,410, Cl. 101-170.000.
Sangamo-Weston, Incorporated: *See*—
Dyck, Rudolph H.; and Kim, Jae S., 4,876,586, Cl. 357-30.000.
Swanson, Scott C., 4,875,783, Cl. 374-170.000.
Sankarasub-Ramanian, Hariharan: *See*—
Singh, Vir B.; Moorthy, Kanniah N. G. K.; Kaushik, Pushpendar K.; and Sankarasub-Ramanian, Hariharan, 4,875,900, Cl. 8-94.270.
Sanner, Martin W., to Tandem Computers Incorporated. Synchronization failure detection. 4,876,701, Cl. 375-106.000.
Sano, Ryuichi; and Isomura, Shigenori, to Nippondenso Co., Ltd. Start control system for internal combustion engine. 4,875,443, Cl. 123-179.00G.
Sano, Shojiro: *See*—
Saeki, Keiso; Sano, Shojiro; Matsuoka, Katsumi; Takashima, Masanobu; and Iwakura, Ken, 4,876,233, Cl. 503-209.000.
Sanofi: *See*—
Barbier, Alain; Breliere, Jean-Claude; and Garcia, Georges, 4,876,247, Cl. 514-89.000.
Breliere, Jean C.; Emonds-Alt, Xavier; and Garcia, Georges, 4,876,248, Cl. 514-108.000.
Radisson, Joel; and Braye, Emile, 4,876,362, Cl. 549-59.000.
Santos, Alfred J.; Cook, Frederick A., Jr.; Duncan, Scott M.; and Moseley, John, to Torrington Company, The. Thrust bearing with a magnetic field detector. 4,875,785, Cl. 384-448.000.
Sanyo Electric Co., Ltd.: *See*—
Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, 4,876,451, Cl. 361-540.000.
Tsukahara, Hitoshi; Kurokawa, Keiko; Tsukui, Toshimitsu; and Nagai, Toshitake, 4,876,070, Cl. 422-122.000.
Sargent & Greenleaf, Inc.: *See*—
Evans, Walter R.; Remenicky, Joseph M.; Jasper, Thomas E.; and Ballard, Wayne W., 4,875,351, Cl. 70-271.000.
Sasa, Takeya; Kobayashi, Yoshikazu; and Makishima, Reichi, to Nitto Kohki Co., Ltd. Fluid coupling. 4,875,720, Cl. 285-249.000.
Sasaki, Katsuhiro; and Fukuda, Seiji, to NEC Corporation. Fault detection signal transmission system. 4,876,686, Cl. 371-49.100.
Sasaki, Ryoichi: *See*—
Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, 4,876,681, Cl. 370-60.000.
Sasaki, Shoko: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,876,263, Cl. 514-338.000.
Sasaki, Yuichi: *See*—
Usami, Jun; Hattori, Akinobu; and Sasaki, Yuichi, 4,875,981, Cl. 204-1.00T.
Sasazawa, Koji: *See*—
Yasunaga, Tadashi; and Sasazawa, Koji, 4,876,113, Cl. 427-39.000.
Sato, Fumihiro: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,876,244, Cl. 514-19.000.
Sato, Fumio: *See*—
Kurokawa, Satoshi; Tayama, Suehiro; and Sato, Fumio, 4,876,306, Cl. 524-423.000.
Sato, Hiroyuki, to Seikosha Co., Ltd. Ink ribbon cassette with slidable ribbon guide. 4,875,789, Cl. 400-196.100.
Sato, Katsuyuki: *See*—
Kobayashi, Sadao; Ishihara, Yuji; Sato, Katsuyuki; and Ijichi, Kouichi, 4,876,141, Cl. 428-217.000.
Sato, Kuniyoshi: *See*—
Noda, Hajime; Sato, Kuniyoshi; and Sotani, Junji, 4,875,522, Cl. 165-104.140.
Sato, Takanori, to Shimizu Construction Co., Ltd. Device for suppressing vibration of structure. 4,875,313, Cl. 52-167.0DF.
Sato, Yoshikazu: *See*—
Sugitani, Yuji; Sato, Yoshikazu; and Nishi, Yasuhiko, 4,876,432, Cl. 219-124.320.
Satoh, Shinichi: *See*—
Sugiyama, Genroku; Hirata, Toichi; and Satoh, Shinichi, 4,875,337, Cl. 60-421.000.
Satoh, Tetsuya: *See*—
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,876,042, Cl. 264-39.000.
Satomura, Shigeyuki: *See*—
Katsumata, Azusa; and Satomura, Shigeyuki, 4,876,616, Cl. 360-53.000.
Sauls, Charles L., to Fisher/Sauls Electronics, Inc. Vending rack burglar alarm. 4,876,532, Cl. 340-689.000.
Saunders, William T., to Weirton Steel Corporation. Convenience packaging. 4,875,597, Cl. 220-458.000.
Saur, Niko K.; and Bronner, Wolfgang, to Agria-Werke GmbH. Control device for operating a motor vehicle. 4,875,536, Cl. 180-6.320.
Sauvage, Laurent: *See*—
Bernard, Patrice; Sauvage, Laurent; Girard, Henri; and Ferrero, Jean-Pierre, 4,876,057, Cl. 376-216.000.
Savard, Donald D., to Interprovincial Pipe Line Company. Vapor plug for temporarily sealing or plugging a pipeline. 4,875,615, Cl. 228-119.000.
Savas, Nick: *See*—
Haque, Sazzadul; Floyd, Thomas O.; Savas, Nick; and Kelm, Walter H., 4,875,812, Cl. 407-104.000.
Savini, Charles: *See*—
Yeh, Chuen Y.; and Savini, Charles, 4,876,392, Cl. 568-404.000.
Sawada, Kohei: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.
Sawada, Masayuki: *See*—
Kakimoto, Yukihiko; Sawada, Masayuki; Kajimoto, Yoshiaki; and Kiguchi, Isamu, deceased, 4,875,909, Cl. 55-40.000.

Sawaide, Minoru: *See*—
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.
Sawin, Steven P.: *See*—
Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,876,320, Cl. 526-62.000.
Sawyer, Hermon R. Ball retrieval system. 4,875,678, Cl. 273-30.000.
Sayer, Wayne L. Methods for detecting rare earth minerals. 4,876,206, Cl. 436-82.000.
Scales, Michael J. Block-formed revetment system for controlling soil erosion. 4,875,803, Cl. 405-16.000.
Schacht, Ulrich: *See*—
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.
Schafer, Randal D. Apparatus for clamping a template to a workpiece. 4,875,667, Cl. 269-91.000.
Schaffer, William E.: *See*—
Vandenberg, Donald E.; Jacques, Donald A.; and Schaffer, William E., 4,875,765, Cl. 350-611.000.
Schafhausen, Aloisius: *See*—
Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, 4,875,308, Cl. 49-501.000.
Schammel, Wayne P.: *See*—
Holzhauer, Juergen K.; Michalak, Dennis J.; and Schammel, Wayne P., 4,876,386, Cl. 562-414.000.
Schandl, Hartmut: *See*—
Kaaden, Jurgen; and Schandl, Hartmut, 4,876,614, Cl. 360-10.200.
Schara, Kristen T.; Kulik, David B.; and McIlvaine, Scott E., to Westinghouse Electric Corp. Automatic dendritic silicon web separation machine. 4,875,461, Cl. 125-23.00R.
Schasteen, Thomas: *See*—
Petermann, Steven G.; and Schasteen, Thomas, 4,876,672, Cl. 367-35.000.
Schatz, Klaus W.: *See*—
Haddad, James H.; Owen, Hartley; and Schatz, Klaus W., 4,875,994, Cl. 208-113.000.
Scheeren, Peter: *See*—
Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, 4,875,308, Cl. 49-501.000.
Schefczik, Ernst: *See*—
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.
Schering Corporation: *See*—
Hou, Donald; Wong, Yee-Shing; Gala, Dinesh; and Steinman, Martin, 4,876,338, Cl. 540-357.000.
Kirkup, Michael P.; and McCombie, Stuart W., 4,876,365, Cl. 549-215.000.
Schumacher, Doris P.; Clark, Jon E.; and Murphy, Bruce L., 4,876,352, Cl. 548-232.000.
Scherubl, Franz, to Atomic Skifabrik Alois Rohrmoser. Method of producing skis and ski. 4,875,702, Cl. 280-602.000.
Schetters, Hartmut; Endl, Josef; and Albert, Winfried, to Boehringer Mannheim GmbH. Process for the quantification of cell populations or subpopulations and a reagent suitable therefor. 4,876,189, Cl. 435-7.000.
Schiedegger, Charles E.: *See*—
MacLeod, Richard J.; and Schiedegger, Charles E., 4,875,318, Cl. 52-211.000.
Schiel, Christian, to J. M. Voith GmbH. Device for drawing an endless belt into a paper making machine. 4,875,975, Cl. 162-273.000.
Schiffman, Julius. Apparatus for promoting the vigilance of a motor vehicle operator. 4,876,594, Cl. 358-103.000.
Schlag, Johannes; Koehnlein, Ernst; Bauer, Peter; Koessler, Ludwig; and Hausz, Alfred F., to BASF Aktiengesellschaft. Cable insulation based on ethylene polymers having high resistance to the formation of water trees. 4,876,147, Cl. 428-379.000.
Schlage Lock Company: *See*—
Smallegan, Jon M.; and Bettger, Richard R., 4,875,352, Cl. 70-395.000.
Schlake, Randall L.: *See*—
Martin, Richard W.; Fisher, John L.; Fortenberry, William R.; Schlake, Randall L.; Dornbrock, Ronald F.; Richerson, James D.; and Marrett, Kenneth E., Sr., 4,875,277, Cl. 29-606.000.
Schleifer, Bernhard: *See*—
Gschwender, Alois; Kruger, Horst; and Schleifer, Bernhard, 4,875,827, Cl. 415-111.000.
Schleizer, William A.: *See*—
Head, James D.; Burns, Edward F.; Schleizer, William A.; White, C. Douglas; and Gentry, Dennis L., 4,875,662, Cl. 266-44.000.
Schlesch, Ronald D.; Armstrong, Merrill H.; Vallery, Stafford J.; and Durham, Harold S., to Armstrong International, Inc. Motorized outrigger drive. 4,875,428, Cl. 114-255.000.
Schlossarczyk, Heinrich: *See*—
Heger, Werner; Kramer, Manfred; and Schlossarczyk, Heinrich, 4,875,503, Cl. 137-856.000.
Schlumberger Industries, Inc.: *See*—
Marshall, John D.; and Mclain, Thomas N., 4,876,002, Cl. 210-136.000.
Schlumberger Technology Corporation: *See*—
Barkans, Anthony C., 4,876,533, Cl. 340-721.000.
Clark, Brian, 4,876,511, Cl. 324-338.000.
Schmid, Wolfgang, to Ciba-Geigy Corporation. Process and compositions for controlling mites parasitizing on honey bees. 4,876,265, Cl. 514-370.000.
Schmidlin, Fred W., to Xerox Corporation. Printing apparatus and toner/developer delivery system therefor. 4,876,561, Cl. 346-159.000.
Schmiedl, Engelbert: *See*—
Zehnder, Paul; Niklaus, Hans-Ulrich; Schmiedl, Engelbert; and Patri, Franz, 4,875,836, Cl. 417-360.000.
Schneider, Karl F.; Haley, William J.; and Miller, Alan L., to Borg-Warner Automotive, Inc. Dual clutch application area and control. 4,875,561, Cl. 192-0.033.
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., to Shell Oil Company. New strains of pseudomonas putida. 4,876,200, Cl. 435-253.300.
Schomann, Klaus-Dieter: *See*—
Dust, Matthias; Neumann, Peter; Schefczik, Ernst; Benthack-Thoms, Heidi; Barzynski, Helmut; Schomann, Klaus-Dieter; Kuppelmaier, Harald; and Koester, Eberhard, 4,876,356, Cl. 548-419.000.
Schramm, Matthias: *See*—
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Schrankel, Kenneth R.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.
Schreiber, Stanley: *See*—
Brook, Arthur H.; Carian, Peter J.; Katzin, Leonard; Landsinger, Edmund E.; Moore, James D.; Rotter, Leah D.; and Schreiber, Stanley, 4,875,469, Cl. 128-26.000.
Schreiner, Joel M.: *See*—
Deutsch, Timothy A.; Schreiner, Joel M.; and McBee, Steve H., 4,875,330, Cl. 56-41.000.
Schroer, Walter: *See*—
Noll, Klaus; Thoma, Wilhelm; Nachtkamp, Klaus; Schroer, Walter; and Pedain, Josef, 4,876,302, Cl. 524-267.000.
Schubert, Axel: *See*—
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.
Schuda, Ann D.; Verhoeven, Thomas R.; and Shinkai, Ichiro, to Merck & Co., Inc. Hydrogenation process for the formation of 4A,5-dihydro HMG-CoA reductase inhibitors. 4,876,364, Cl. 549-214.000.
Schulte, Bernhard: *See*—
Dziurla, Heinz-Jurgen; Freitag, Dieter; Waldenrath, Werner; Burkhardt, Claus; and Schulte, Bernhard, 4,876,033, Cl. 252-511.000.
Schumacher, Doris P.; Clark, Jon E.; and Murphy, Bruce L., to Schering Corporation. Pressurized fluorination of hydroxy alkyl groups. 4,876,352, Cl. 548-232.000.
Schurch, Hans: *See*—
Comte, Pierre-Andre ; Schurch, Hans; and Ritter, Gebhard, 4,875,475, Cl. 128-924.00Y.
Schurter, Rolf; Meyer, Willy; and Fory, Werner, to Ciba-Geigy Corporation. N-pyridinylsulfonyl-N'-pyrimidinylures. 4,875,923, Cl. 71-92.000.
Schurter, Rolf; and Diel, Peter J., to Ciba-Geigy Corporation. 3-Fluoropyridyl-2-oxy-phenoxy derivatives having herbicidal activity. 4,875,926, Cl. 71-94.000.
Schutten, Michael J.: *See*—
Park, John N.; Steigerwald, Robert L.; and Schutten, Michael J., 4,876,635, Cl. 363-17.000.
Schutz, Joachim; and Schweikert, Otto E., to Hoechst Aktiengesellschaft. Process for the preparation of 6-methyl-3,4-dihydro-1,2,3-oxathiazin-4-one 2,2-dioxide. 4,876,341, Cl. 544-2.000.
Schwabische Huttenwerke GmbH: *See*—
Zaoralek, Heinz-Michael, 4,875,297, Cl. 34-48.000.
Schwartz, Karl-Gunter, to G & H Montage. Wall panelling for altering the acoustic properties of a wall. 4,875,312, Cl. 52-144.000.
Schwarz, Robert E.: *See*—
Orsburn, Michael L.; Hemsky, Robert L.; Tucker, Terry L.; Schwarz, Robert E.; and Fearing, Craig F., 4,876,589, Cl. 358-22.000.
Schweikert, Otto E.: *See*—
Schutz, Joachim; and Schweikert, Otto E., 4,876,341, Cl. 544-2.000.
Scott, William D.; and Swartout, James J. Miter box attachment for cutting crown mouldings and the like. 4,875,399, Cl. 83-468.300.
Scowen, Kenneth J.: *See*—
Mittler, Martin A.; and Scowen, Kenneth J., 4,876,627, Cl. 361-293.000.
Scribner, Richard M.: *See*—
Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., 4,876,269, Cl. 514-429.000.
Scripps Clinic and Research Foundation: *See*—
Smith, Richard; Lamb, Peta-Maree; Curtiss, Linda K.; and Witztum, Joseph, 4,876,188, Cl. 435-7.000.
Seewer AG: *See*—
Morgenthaler, Eugen, 4,876,098, Cl. 426-231.000.
Seglin, Leonard: *See*—
Mauleon, Jean-Louis; Sigaud, Jean-Bernard; Chapotel, Bernard; and Seglin, Leonard, 4,875,993, Cl. 208-113.000.

Seibulite International Kabushiki Kaisha: *See*—
Kobayashi, Sadao; Ishihara, Yuji; Sato, Katsuyuki; and Ijichi, Kouichi, 4,876,141, Cl. 428-217.000.
Seiko Epson Corporation: *See*—
Moriya, Tatsuo, 4,876,677, Cl. 368-87.000.
Seiko Instruments Inc.: *See*—
Kaito, Takashi; and Adachi, Tatsuya, 4,876,112, Cl. 427-38.000.
Seikosha Co., Ltd.: *See*—
Ishida, Hiroaki; Shinozaki, Nobuo; and Nakazawa, Michitake, 4,876,563, Cl. 354-234.100.
Sato, Hiroyuki, 4,875,789, Cl. 400-196.100.
Seiler, Claus-Dietrich: *See*—
Rauleder, Hartwig; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,876,337, Cl. 556-415.000.
Sejvar, James: *See*—
Bauer, Frank I.; Mavretish, Robert S.; Shogan, Regis P.; and Sejvar, James, 4,876,593, Cl. 358-100.000.
Sekiguchi, Takuji: *See*—
Kitamoto, Tatsuji; Yokoyama, Katsuya; and Sekiguchi, Takuji, 4,875,610, Cl. 226-10.000.
Sekine Corporation: *See*—
Canada, Larry J., 4,875,792, Cl. 401-283.000.
Selby, Geoffrey R., to U.S. Philips Corporation. Mobile radio transmission system. 4,876,738, Cl. 455-33.000.
Seltzer, Raymond; Ravichandran, Ramanathan; and Patel, Ambelal R., to Ciba-Geigy Corporation. Polyolefin compositions stabilized with long chain N,N-dialkylhydroxylamines. 4,876,300, Cl. 524-100.000.
Semethy, Kenneth F.: *See*—
Fero, Arnold H.; Potochnik, Lawrence M.; Riling, Ronald W.; and Semethy, Kenneth F., 4,876,058, Cl. 376-247.000.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei; and Mase, Akira, 4,875,378, Cl. 73-862.040.
Sempell Aktiengesellschaft: *See*—
Hafele, Carl H.; and Weyand, Manfred, 4,875,659, Cl. 251-282.000.
Senger, Detlef: *See*—
Pietzsch, Ludwig; Senger, Detlef; Winter, Horst; and Vollinger, Hubert, 4,876,600, Cl. 358-183.000.
Senoo, Seiichi: *See*—
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, 4,875,947, Cl. 148-113.000.
Seppi, Edward J., to Varian Associates, Inc. Compressional wave hyperthermia treating method and apparatus. 4,875,487, Cl. 128-660.030.
Sepsi, Robert R.: *See*—
Bittorf, Bradley J.; Flood, Mark A.; Kalan, Michael D.; and Sepsi, Robert R., 4,876,664, Cl. 364-900.000.
Serter, Erbil H. Hull forms. 4,875,425, Cl. 114-56.000.
Sette, Paul R.: *See*—
Gasiunas, Donatas V.; Sette, Paul R.; and Storace, Anthony, 4,875,788, Cl. 400-163.100.
Seuter, Friedel: *See*—
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, 4,876,255, Cl. 514-252.000.
Seven W. Enterprises, Inc.: *See*—
Weder, Donald E.; and Chi, Tsu T., 4,876,192, Cl. 435-21.000.
Seward, George: *See*—
Goldner, Ronald B.; Haas, Terry; Wong, Kwok-Keung; and Seward, George, 4,876,628, Cl. 361-313.000.
Sgrignoli, Gary J.: *See*—
Citta, Richard W.; Gosc, Paul M.; Mutzabaugh, Dennis M.; and Sgrignoli, Gary J., 4,876,718, Cl. 380-42.000.
Shafer, Sheldon J.: *See*—
Blackmon, Kenneth P.; Clagett, Donald C.; Fox, Daniel W.; Maresca, Louis M.; and Shafer, Sheldon J., 4,876,317, Cl. 525-433.000.
Shankar, Kapil; and Agrawal, Om, to Advanced Micro Devices, Inc. Logic controller having programmable logic "and" array using a programmable gray-code counter. 4,876,640, Cl. 364-200.000.
Shape Inc.: *See*—
Gelardi, Anthony; Lowry, Alan; and Lovecky, Craig, 4,875,743, Cl. 312-13.000.
Shargay, Cathleen A.: *See*—
Hsieh, C. Richard; King, Desmond F.; Pettersen, Frederick A.; and Shargay, Cathleen A., 4,875,996, Cl. 208-157.000.
Sharp, Bruce R. Double walled storage tanks with common rib supports. 4,875,361, Cl. 73-49.200.
Sharp Kabushiki Kaisha: *See*—
Honda, Iwakazu, 4,876,613, Cl. 358-471.000.
Kamimura, Taisuke, 4,876,573, Cl. 355-250.000.
Ogura, Mitsuru; and Tsukamoto, Kimihide, 4,876,577, Cl. 355-315.000.
Shaughnessy, Ernest P. Modular building. 4,875,310, Cl. 52-81.000.
Shaw, Arthur B.: *See*—
Feldman, Fred; Klekamp, Mark S.; Hrinda, Michael E.; Shaw, Arthur B.; and Chandra, Sudhish, 4,876,241, Cl. 514-2.000.
Shaw, Steven; and Weiss, Elmar, to Dr. Ing H.c.F. Porsche Aktiengesellschaft. Brake arrangement. 4,875,556, Cl. 188-72.400.
Shelby Paper Box Co., The: *See*—
Kadleck, Richard G.; and Nowak, William W., 4,875,585, Cl. 206-426.000.
Shell Canada Limited: *See*—
Verhoeff, Abraham, 4,876,004, Cl. 210-170.000.
Shell Explorer Limited: *See*—
Verhoeff, Abraham, 4,876,004, Cl. 210-170.000.
Shell Oil Company: *See*—
Allen, Robert C., 4,876,307, Cl. 524-612.000.
Drent, Eit, 4,876,401, Cl. 568-861.000.
Hoxmeier, Ronald J.; and Slaugh, Lynn H., 4,876,314, Cl. 525-338.000.
Hwo, Charles C., 4,876,156, Cl. 428-516.000.
Job, Robert C., 4,876,230, Cl. 502-171.000.
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,876,200, Cl. 435-253.300.
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,876,286, Cl. 518-700.000.
Van Kleeck, David A., 4,876,075, Cl. 423-226.000.
Vonk, Willem C.; and van Gooswilligen, Gerrit, 4,876,130, Cl. 428-40.000.
Zon, Arie Van; and Coleman, Brian, 4,876,020, Cl. 252-40.500.
Sheppard, Clyde H.: *See*—
Lubowitz, Hyman R.; and Sheppard, Clyde H., 4,876,328, Cl. 528-322.000.
Sherburne, David G., to Eastman Kodak Company. Transporting and sorting system for a flexible workpiece. 4,875,671, Cl. 271-302.000.
Sherex Chemical Company, Inc.: *See*—
Hughes, Leonard; Fuller, James G.; and Earl, Gary W., 4,876,355, Cl. 548-352.000.
Shia, John J.: *See*—
Kesler, John K.; McCown, Robert J.; and Shia, John J., 4,875,366, Cl. 73-118.100.
Shibahara, Harue: *See*—
Ishiwa, Hiromi; Shibahara, Harue; Mutai, Masahiko; and Tsuchida, Nobuo, 4,876,202, Cl. 435-320.000.
Shibuya, Katsuhiko: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,876,263, Cl. 514-338.000.
Shicoh Engineering Co., Ltd.: *See*—
Shiraki, Mansbu; and Hirano, Norimitsu, 4,876,472, Cl. 30-198.000.
Shigaki, Takao: *See*—
Ozawa, Yoshio; Yamamoto, Takashi; Shigaki, Takao; and Kaneko, Rokusaburo, 4,876,568, Cl. 355-56.000.
Shihabi, David S.: *See*—
Bowes, Emmerson; Chang, Clarence D.; Han, Scott; and Shihabi, David S., 4,876,411, Cl. 585-533.000.
Chang, Clarence D.; Chu, Cynthia T-W; Chu, Pochen; Dessau, Ralph M.; Garwood, William E.; Kuehl, Guenter H.; Miale, Joseph N.; and Shihabi, David S., 4,876,228, Cl. 502-71.000.
Shimazu, Hideaki; Ito, Hiroshi; and Yamakoshi, Kenichi, to Inoue, Takashi; and Kabushiki Kaisha Nihon M.D.M. System for measuring the volume of a part of a human body. 4,875,488, Cl. 128-694.000.
Shimazu, Takashi: *See*—
Shindou, Yoshio; Kabeya, Motoo; Shimazu, Takashi; and Yamazaki, Fumio, 4,876,160, Cl. 428-623.000.
Shimek, Daniel C.: *See*—
Shimek, Ronald J.; and Shimek, Daniel C., 4,875,464, Cl. 126-92.00R.
Shimek, Ronald J.; and Shimek, Daniel C. Clean burning gas log burner system. 4,875,464, Cl. 126-92.00R.
Shimida, Shinichi: *See*—
Suzuki, Shigeru; and Shimida, Shinichi, 4,875,438, Cl. 123-52.0MB.
Shimizu Construction Co., Ltd.: *See*—
Sato, Takanori, 4,875,313, Cl. 52-167.0DF.
Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, 4,876,143, Cl. 428-294.000.
Shimizu, Hiroshi; and Yamaguchi, Yoshito. Voice recognizing alarm timepiece. 4,876,676, Cl. 368-63.000.
Shimizu, Mitsuru: *See*—
Sugiyama, Toshinori; Ikegaki, Tetsurou; Shimizu, Mitsuru; and Tuburaya, Yoshitane, 4,876,133, Cl. 428-64.000.
Shimoda, Eiji: *See*—
Kikukawa, Hiroyasu; Shimoda, Eiji; Sakai, Mari; and Kitada, Fumiko, 4,875,908, Cl. 55-16.000.
Shimodaira, Hisayo; Ono, Toshio; Miyawaki, Keizo; and Hamaguchi, Tatsuya, to Mitsubishi Denki Kabushiki Kaisha. Fiber reinforced plastic reflector. 4,875,766, Cl. 350-641.000.
Shimokawa, Kazuhiro: *See*—
Hisanaga, Yorisato; Shimokawa, Kazuhiro; Kawano, Toshihiko; Suita, Yasunori; and Yamashita, Tsuneo, 4,876,245, Cl. 514-29.000.
Shimokobe, Jiro: *See*—
Morohashi, Katsuei; Shimokobe, Jiro; and Shimoma, Taketoshi, 4,876,478, Cl. 313-413.000.
Shimoma, Taketoshi: *See*—
Morohashi, Katsuei; Shimokobe, Jiro; and Shimoma, Taketoshi, 4,876,478, Cl. 313-413.000.
Shimomura, Shoji: *See*—
Miyagawa, Michiaki; Ishizaka, Yutaka; and Shimomura, Shoji, 4,876,732, Cl. 382-41.000.
Shin-Etsu Chemical Co., Ltd.: *See*—
Itoh, Kunio; and Shiobara, Toshio, 4,876,298, Cl. 523-433.000.
Itoh, Kunio; Fukushima, Motoo; and Nakamura, Tsutomu, 4,876,344, Cl. 544-219.000.
Shin-Etu Handotai Co., Ltd.: *See*—
Watanabe, Masataka; Ohhara, Nobuhiro; and Taguchi, Kenichi, 4,876,438, Cl. 219-497.000.

Shin, Sung-Chul, to Eastman Kodak Company. Magnetrooptical recording media and method of preparing them. 4,876,159, Cl. 428-607.000.

Shindou, Yoshio; Kabeya, Motoo; Shimazu, Takashi; and Yamazaki, Fumio, to Nippon Steel Corporation. Organic composite-plated steel sheet. 4,876,160, Cl. 428-623.000.

Shinjo, Kenji: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Kobayashi, Toyoko; and Shinjo, Kenji, 4,876,027, Cl. 252-299.650.

Shinkai, Ichiro: *See*—
Schuda, Ann D.; Verhoeven, Thomas R.; and Shinkai, Ichiro, 4,876,364, Cl. 549-214.000.

Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, to Hokkai Can Co., Ltd. Apparatus and method for manufacturing tubular member. 4,875,960, Cl. 156-203.000.

Shinozaki, Nobuo: *See*—
Ishida, Hiroaki; Shinozaki, Nobuo; and Nakazawa, Michitake, 4,876,563, Cl. 354-234.100.

Shiobara, Toshio: *See*—
Itoh, Kunio; and Shiobara, Toshio, 4,876,298, Cl. 523-433.000.

Shioiri, Noriaki: *See*—
Hasegawa, Hiroshi; Shioiri, Noriaki; Narita, Tadashi; and Katori, Tatsuhiko, 4,876,359, Cl. 548-533.000.

Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, to Nihon Tokushu Noyaku Seizo K.K. Pesticidal nitro-substituted heterocyclic compounds. 4,876,263, Cl. 514-338.000.

Shioya, Katsuhiko; Ifuku, Tetsuhiko; and Inamasu, Seiichi, to Fujitsu Limited. Diagnostic system. 4,876,645, Cl. 364-200.000.

Shirafuji, Hideo; Yamaguchi, Takamasa; and Nogami, Ikuo, to Takeda Chemical Industries, Ltd. Process for producing 2-keto-D-glucaric acid. 4,876,195, Cl. 435-137.000.

Shiraki, Manabu; and Hirano, Norimitsu, to Shicoh Engineering Co., Ltd.; and M. Gottlieb Assoc. Five-phase dc motor with non-overlapping armature windings. 4,876,472, Cl. 30-198.000.

Shirokane, Makoto: *See*—
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; and Yamazaki, Tatsuo, 4,876,119, Cl. 427-250.000.

Shiroshita, Masao: *See*—
Mizutani, Masato; Shiroshita, Masao; Sakaki, Masaharu; Okuda, Hiroki; and Mito, Nobuaki, 4,875,924, Cl. 71-92.000.

Shmidt, Iosif; and Badiali, Mario, to Membrex Incorporated. Small volume rotary filter. 4,876,013, Cl. 210-650.000.

Sho, Ikuo: *See*—
Isono, Koichi; and Sho, Ikuo, 4,876,456, Cl. 250-561.000.

Shogan, Regis P.: *See*—
Bauer, Frank I.; Mavretish, Robert S.; Shogan, Regis P.; and Sejvar, James, 4,876,593, Cl. 358-100.000.

Shoji, Tadao: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Shrinkle, Louis J.: *See*—
Squires, John P.; and Shrinkle, Louis J., 4,876,491, Cl. 318-138.000.

Shriver, H. Randall; Dunnavant, William R.; and Gruber, Bruce A., to Ashland Oil, Inc. Foundry binder systems based upon acrylated epoxy resins and epoxy resins. 4,876,294, Cl. 523-139.000.

Shroot, Braham: *See*—
Lang, Gerard; Maignan, Jean; Forestier, Serge; Restle, Serge; Lagrange, Alain; and Shroot, Braham, 4,876,381, Cl. 560-56.000.

Shuster, Jeffrey R.: *See*—
Burke, Rae Lyn; Rosenberg, Steven; Shuster, Jeffrey R.; Tekamp-Olson, Patricia A.; and Valenzuela, Pablo D. T., 4,876,197, Cl. 435-172.300.

Sibilia, John P.: *See*—
Khanna, Yash P.; Bhattacharjee, Himangshu R.; Kumar, Rakesh; Williams, Jon I.; and Sibilia, John P., 4,876,127, Cl. 428-35.700.

SICAM S.p.A.: *See*—
Brambilla, Silvio, 4,875,736, Cl. 297-440.000.

Sie, Swan T.; Drent, Eit; and Jager, Willem W., to Shell Oil Company. Process for the production of methanol and a composition suitable for use as a catalyst in said process. 4,876,286, Cl. 518-700.000.

Siebold, Horst; and Ries, Gunter, to Siemens Aktiengesellschaft. Apparatus for nuclear spin tomography having superconducting base field magnetic coils and a radiation shield. 4,876,510, Cl. 324-318.000.

Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, to Hoechst Aktiengesellschaft. Arylmethylazoles and their salts, processes for their preparation, agents which contain these compounds, and their use. 4,876,354, Cl. 548-341.000.

Siemens Aktiengesellschaft: *See*—
Bast, Ulrich; and Wersing, Wolfram, 4,876,179, Cl. 430-320.000.
Bruen, Johannes; and Latussek, Hans-Peter, 4,875,869, Cl. 439-189.000.
Haan, Franz; and Hock, Lothar, 4,875,285, Cl. 29-832.000.
Mitlmeier, Norbert; and Koppmann, Bardo, 4,876,522, Cl. 335-193.000.
Niederhuefner, Detlev; Hahn, Guenter; and Baczyzmalski, Andrzej, 4,876,417, Cl. 200-48.00V.
Siebold, Horst; and Ries, Gunter, 4,876,510, Cl. 324-318.000.
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.

Siemens Aktiengesellschaft: *See*—
Budde, Klaus; Koch, Friedrich; and Quella, Ferdinand, 4,876,322, Cl. 526-242.000.

Siemens Energy & Automation, Inc.: *See*—
Boyd, Donald R., 4,876,521, Cl. 335-179.000.
Leone, David A.; Buxton, Clifford A.; and Robbins, W. Dale, 4,876,424, Cl. 200-306.000.

Siemonsen, Hans-Peter: *See*—
Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, 4,875,308, Cl. 49-501.000.

Siems, Wolfgang, to Korber. Method of and apparatus for making a rod of fibrous material. 4,875,494, Cl. 131-84.100.

Sierracin Corporation: *See*—
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,876,178, Cl. 430-314.000.

Sigaud, Jean-Bernard: *See*—
Mauleon, Jean-Louis; Sigaud, Jean-Bernard; Chapotel, Bernard; and Seglin, Leonard, 4,875,993, Cl. 208-113.000.

Signorelli, John A.: *See*—
Wright, Norman D.; Glanzner, Gary C.; and Signorelli, John A., 4,875,412, Cl. 101-425.000.

Signoret, Jacques, to ABG Semca. High-performance air-conditioning installation for aircraft. 4,875,345, Cl. 62-402.000.

Silomaster, Inc.: *See*—
Fleckenstein, Phillip P., 4,875,295, Cl. 33-720.000.

Silva, Donald M.; Silva, Leroy F.; and Fehsenfeld, Fred M., Sr., to Electronic Research Group, Inc. Low-noise switching power supply having variable reluctance transformer. 4,876,638, Cl. 363-97.000.

Silva, Leroy F.: *See*—
Silva, Donald M.; Silva, Leroy F.; and Fehsenfeld, Fred M., Sr., 4,876,638, Cl. 363-97.000.

Simons, Johannes M. M., to U.S. Philips Corp. Synthetic resin composition, substrate material for printed circuit boards and method of manufacturing a synthetic resin composition. 4,876,319, Cl. 525-456.000.

Simplimatic Engineering Company: *See*—
Wiseman, John A., 4,875,573, Cl. 198-831.000.

Simshauser, Steven C.: *See*—
Adams, Lowell J.; Simshauser, Steven C.; Pisarski, Nathan; and Weisend, Norbert A., Jr., 4,875,644, Cl. 244-134.00R.

SINCO, Inc.: *See*—
Denny, David S.; Metzger, Edward C. R.; Rexroad, John; and Glynn, William, 4,875,549, Cl. 182-138.000.

Singh, Vir B.; Moorthy, Kanniah N. G. K.; Kaushik, Pushpendar K.; and Sankarasub-Ramanian, Hariharan. Method of treating leather. 4,875,900, Cl. 8-94.270.

Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH: *See*—
Vermot-Gaud, Jacque; Cottenceau, Remi; and Zuercher, Erwin, 4,875,347, Cl. 66-219.000.

Sirois, William L., to Copeland-Sirois Enterprises, Inc. Boat building method using modular propulsion system. 4,875,430, Cl. 114-355.000.

Sitrin, Gabriel M. Control pedal apparatus for a motor vehicle. 4,875,385, Cl. 74-512.000.

Skallen, Bengt, to Eur-Control Kalle AB. Method and apparatus for measuring the viscosity of a medium. 4,875,362, Cl. 73-54.000.

Skarsten, Stephen R., to Skilten Tools Limited. Portable work bench. 4,875,513, Cl. 144-286.00R.

SKF Plasma Technologies AB: *See*—
Gustafsson, Bengt O.; and Johansson, Nils B., 4,876,074, Cl. 423-210.500.

Skilten Tools Limited: *See*—
Skarsten, Stephen R., 4,875,513, Cl. 144-286.00R.

Skinner, Daniel R.: *See*—
Rogers, Max W.; and Skinner, Daniel R., 4,876,709, Cl. 379-61.000.

Slattery, Gordon C., to Brunswick Corporation. Latch assembly for releasably securing cowl sections of an outboard motor. 4,875,883, Cl. 440-77.000.

Slaugh, Lynn H.: *See*—
Hoxmeier, Ronald J.; and Slaugh, Lynn H., 4,876,314, Cl. 525-338.000.

Slide Management Systems, Inc.: *See*—
Lamb, Owen L., 4,875,588, Cl. 209-3.300.

Sloan Valve Co.: *See*—
Berdichevsky, Boris, 4,875,397, Cl. 82-60.000.

Slonneger, Stephen. Solar heating disc. 4,875,466, Cl. 126-415.000.

Slusarski, Ronald S.: *See*—
Miller, Theodore H., deceased; and Slusarski, Ronald S., 4,875,722, Cl. 292-92.000.

Smallegan, Jon M.; and Bettger, Richard R., to Schlage Lock Company. Construction keying. 4,875,352, Cl. 70-395.000.

Smith, Bobby E.: *See*—
Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., 4,876,291, Cl. 521-124.000.

Smith, Donald P. Method and apparatus for water vapor control in convection ovens. 4,876,426, Cl. 219-10.55A.

Smith, Edward M.; and Cornelison, Richard C., to W. R. Grace & Co.-Conn. Waste heat recovery system. 4,875,436, Cl. 122-7.00R.

Smith, Gilbert W.; Daniel, Mervyn F.; Barton, John W.; and Ratcliffe, Norman M., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Majesty's Government of the. Langmuir blodgett films. 4,876,150, Cl. 428-411.100.

Smith, James A.: *See*—
Norton, Edward J.; Fram, Craig F.; Graham, Kenneth W.; and Smith, James A., 4,876,053, Cl. 264-255.000.

Smith, Michael L.: *See*—
Moran, Kevin E.; Smith, Michael L.; and Lippard, Ernest R., III, 4,875,780, Cl. 356-446.000.
Smith, Richard; Lamb, Peta-Maree; Curtiss, Linda K.; and Witztum, Joseph, to Scripps Clinic and Research Foundation. Novel immunochemical method for assaying stable glycosylated hemoglobin. 4,876,188, Cl. 435-7.000.
Smith, Richard A., to Sunbeam Corporation. Brush holder with plastic cup to retain biasing spring. 4,876,475, Cl. 310-239.000.
Smith, Robert L.: *See*—
Hoffman, William F.; Lee, Ta J.; Smith, Robert L.; and Rooney, Clarence S., 4,876,366, Cl. 514-570.000.
Smith, Roy E.: *See*—
Hoehener, Alfred; and Smith, Roy E., 4,876,333, Cl. 534-575.000.
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, to Montgomery Elevator Company. Modular elevator cab construction. 4,875,552, Cl. 187-1.00R.
Smith, Stephen W.; Londeen, Gilbert E.; and Lair, Christopher, to Montgomery Elevator Company. Modular elevator cab construction. 4,875,553, Cl. 187-1.00R.
SmithKline Beckman Corporation: *See*—
Kruse, Lawrence I.; Leonard, Thomas B.; and Ross, Stephen T., 4,876,266, Cl. 514-392.000.
Marshall, Garland R.; and Moore, Michael L., 4,876,243, Cl. 514-11.000.
Sneddon, James C.: *See*—
Falconer, Donald R.; and Sneddon, James C., 4,875,252, Cl. 16-288.000.
Snow, Robert A.; McGuckin, Hugh G.; Ponticello, Ignazio S.; Daly, Robert C.; Pace, Laurel J.; Fischer, Sandra K.; and Hanrahan, Michael J., to Eastman Kodak Company. Color filter array containing a photocrosslinked polymeric mordant. 4,876,167, Cl. 430-7.000.
Snyder, Michael D.: *See*—
Foley, Daniel M.; Snyder, Michael D.; and Long, John D., 4,875,527, Cl. 172-248.000.
Snyder, Stephen W.; Monsell, Craig C.; and Puckett, Carol S., to Procter & Gamble Company, The. Pouched laundry wash active dispenser for improved solubility. 4,875,575, Cl. 206-0.500.
Societe Chimique des Charbonnages S.A.: *See*—
Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, 4,876,036, Cl. 252-637.000.
Marius, Hert, 4,875,964, Cl. 156-327.000.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA" : *See*—
Fetiveau, Jean Y. L., 4,875,831, Cl. 416-228.000.
Societe Nationale Elf Aquitaine (Production): *See*—
Gongora, Henri; and Darche, Yves, 4,876,389, Cl. 568-26.000.
Societe SKIS ROSSIGNOL S.A.: *See*—
Movilliat, Pierre A.; Piegay, Yves; and Gardin, Gilles D., 4,875,679, Cl. 273-73.00R.
Soga, Katumasa; and Matsutani, Kazuo, to Kawasaki Jukogyo Kobushiki Kaisha. Float attachment for watercrafts. 4,875,426, Cl. 114-123.000.
Solarek, Daniel B.; Dirscherl, Teresa A.; Hernandez, Henry R.; and Jarowenko, Wadym, to National Starch and Chemical Corporation. Amphoteric starches and process for their preparation. 4,876,336, Cl. 536-109.000.
Solidiwaste Technology, L.P.: *See*—
Somerville, Robin; and Fan, Liang-Tseng, 4,875,905, Cl. 44-589.000.
Solomon, Ruth; and Rosenberg, Harvey J. Musical garment. 4,875,238, Cl. 2-115.000.
Solv-Ex Corporation: *See*—
Rendall, John S., 4,875,998, Cl. 208-390.000.
Somerville, Robin; and Fan, Liang-Tseng, to Solidiwaste Technology, L.P. Method of preparing a high heating value fuel product. 4,875,905, Cl. 44-589.000.
Sone, Junji: *See*—
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.
Sonoco Products Company: *See*—
Kewin, Daniel D., 4,875,636, Cl. 242-68.600.
Sony Corporation: *See*—
Endo, Katsuo; and Makino, Masahiro, 4,875,641, Cl. 242-199.000.
Katsumata, Azusa; and Satomura, Shigeyuki, 4,876,616, Cl. 360-53.000.
Kihara, Taku, 4,876,599, Cl. 358-162.000.
Makagami, Tarp; Fukami, Takeshi; and Terauchi, Toshiro, 4,876,719, Cl. 381-1.000.
Suzuki, Masayuki, 4,876,619, Cl. 360-97.010.
Urata, Kaoru; Nakashio, Miaki; Ono, Koichi; Hirai, Hitoshi; and Iwamoto, Masayuki, 4,876,703, Cl. 377-62.000.
Sotani, Junji: *See*—
Noda, Hajime; Sato, Kuniyoshi; and Sotani, Junji, 4,875,522, Cl. 165-104.140.
Sotolongo, Thomas J.: *See*—
Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; and Sotolongo, Thomas J., 4,875,865, Cl. 439-101.000.
Sotoya, Kohshiro: *See*—
Hirota, Hajime; Ogino, Hidekazu; Igarashi, Sahoko; and Sotoya, Kohshiro, 4,876,034, Cl. 252-546.000.
SP Tyres UK Limited: *See*—
Walker, John C.; and Holmes, Thomas, 4,876,528, Cl. 340-442.000.
Spackman, Ramon: *See*—
Clayton, Colin G.; and Spackman, Ramon, 4,876,056, Cl. 376-152.000.
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, to Siemens Aktiengesellschaft. Optoelectronic coupling element and method for its manufacture. 4,875,750, Cl. 350-96.180.
Sparkes, Julian G. Roof insulation support system. 4,875,320, Cl. 52-406.000.
Specht, Donald P.: *See*—
Chen, Chin H.; Fox, John L.; Specht, Donald P.; and Farid, Samir Y., 4,876,175, Cl. 430-281.000.
Spectra-Physics, Inc.: *See*—
Rando, Joseph F.; and Blumer, Eric W., 4,876,691, Cl. 372-65.000.
Sperotto Rimar S.p.A.: *See*—
Vecchia, Gino D., 4,875,260, Cl. 26-81.000.
Spiegel, Bernt: *See*—
Bosse, Gerhard R.; Lienow, Michael; Spiegel, Bernt; and Kruse, Bernd O., 4,875,652, Cl. 248-311.200.
Spirax Sarco Limited: *See*—
Robertson, Robert A., 4,875,377, Cl. 73-861.020.
Spiteri, Joseph. Heavy duty flasher. 4,876,526, Cl. 340-471.000.
Spitzer, Martin, to Witronic Elektronische Gerate Gesellschaft M.B.H. Apparatus for measuring the contents of a tank. 4,875,370, Cl. 73-309.000.
Spriggs, John R.: *See*—
Hinduja, Murli; Thompson, Mark L.; and Spriggs, John R., 4,875,363, Cl. 73-56.000.
Spyra, Rudolf A., to Computer Output Processors and Engineering, Inc. High speed sheet folder and presser for automated mailing systems. 4,875,668, Cl. 270-45.000.
Square D Company: *See*—
Libert, James T., 4,876,468, Cl. 307-643.000.
Squires, John P.; and Shrinkle, Louis J., to Conner Peripherals, Inc. Method and apparatus for brushless DC motor speed control. 4,876,491, Cl. 318-138.000.
Srebnik, Morris: *See*—
Mechoulam, Raphael; Feigenbaum, Jeffery J.; Lander, Naphtali; and Srebnik, Morris, 4,876,276, Cl. 514-454.000.
Sremba, Gerald F.; Sremba, Patricia M.; and Sullivan, James P., to Sremba, Gerald F.; and Sremba, Patricia M. Book shade. 4,875,708, Cl. 281-45.000.
Sremba, Patricia M.: *See*—
Sremba, Gerald F.; Sremba, Patricia M.; and Sullivan, James P., 4,875,708, Cl. 281-45.000.
SS Pharmaceutical Co., Ltd.: *See*—
Hasegawa, Hiroshi; Shioiri, Noriaki; Narita, Tadashi; and Katori, Tatsuhiko, 4,876,359, Cl. 548-533.000.
Stadler, Hansjorg; and von Laar, Klaus, to Diehl GmbH & Co. Explosive charge with a projectile-forming metallic insert. 4,875,414, Cl. 102-307.000.
Stadler, Karl, to Patent-Treuhand-Gesellschaft fur elektrische Gluhlampen. Halogen cycle incandescent lamp structure. 4,876,482, Cl. 313-579.000.
Stamicarbon B.V.: *See*—
Peerlkamp, Erik R.; and Gijsman, Pieter, 4,876,301, Cl. 524-255.000.
Vriesema, Bindert K.; and Miniaci, Francesco, 4,876,327, Cl. 528-173.000.
Standard Oil Company, The: *See*—
DiCosimo, Robert; Burrington, James D.; and Suresh, Dev D., 4,876,348, Cl. 546-252.000.
Gardner, Bronson; Keener, Melvin E.; DeSutter, Steven C.; Jagatich, Carl T.; and Felice, Ralph A., 4,876,647, Cl. 364-420.000.
Stanton, Harbor E.: *See*—
Parmely, Kevin W.; Van Asten, Scot R.; and Stanton, Harbor E., 4,876,674, Cl. 367-139.000.
State of Israel, Israel Institute of Biological Research: *See*—
Fisher, Abraham; and Karton, Ishai, 4,876,260, Cl. 514-278.000.
State of Israel, Prime Minister's Office Israel Atomic Energy Commission, Soreq Nuclear Research Center: *See*—
Issachar, David; Trumper, Jacob; and Abrashkin, Shmuel, 4,876,073, Cl. 423-2.000.
Statomat-Globe Maschienenfabrik GmbH: *See*—
Kolodziej, Helmut, 4,875,571, Cl. 198-431.000.
STC PLC: *See*—
Cawthorne, Christopher D., 4,876,489, Cl. 342-383.000.
Steele, Donald F.; Hoagland, Lawrence C.; Kyricos, Christopher; and Tolan, Peter, to Airxchange, Inc. Desiccant heat device. 4,875,520, Cl. 165-10.000.
Steen, Gerry: *See*—
Lindberg, Kaj; Steen, Gerry; and Germundson, Elon, 4,875,806, Cl. 405-224.000.
Steffes, Thomas J.: *See*—
Widmer, Steven L.; Neisen, Gerald F.; Ruhnke, Jeffrey P.; Steffes, Thomas J.; and Buchholz, Brian S., 4,875,439, Cl. 123-541.000.
Stegman, David A.: *See*—
Proehl, Gary S.; Gingello, Anthony D.; Collett, David J.; Parton, Richard L.; Stegman, David A.; and Adin, Anthony, 4,876,181, Cl. 430-522.000.
Steiger, Ronald P.: *See*—
Kroeger, Michael K.; Longo, John M.; Steiger, Ronald P.; and Leung, Peter K., 4,876,512, Cl. 324-376.000.
Steigerwald, Franz: *See*—
Hilderbrandt, Bodo; and Steigerwald, Franz, 4,875,577, Cl. 206-219.000.

Steigerwald, Robert L.: *See—*
Park, John N.; Steigerwald, Robert L.; and Schutten, Michael J., 4,876,635, Cl. 363-17.000.

Steiner, Eva: *See—*
Salzbrunn, Wolfgang; Steiner, Eva; Wohrer, Wilfried; and Meixner, Otto, 4,876,196, Cl. 435-161.000.

Steinman, Martin: *See—*
Hou, Donald; Wong, Yee-Shing; Gala, Dinesh; and Steinman, Martin, 4,876,338, Cl. 540-357.000.

Steltzer, Edward L., to Digital Equipment Corporation. Programmed ratio mechanical transmission. 4,875,635, Cl. 242-67.30R.

Sterling Engineered Products Inc.: *See—*
Hinduja, Murli; Thompson, Mark L.; and Spriggs, John R., 4,875,363, Cl. 73-56.000.

Stevenson, John. Grinding wheel dressing apparatus. 4,875,460, Cl. 125-11.0DF.

Stewart, Wayne: *See—*
Dixon, George G.; Parlman, Robert M.; and Stewart, Wayne, 4,876,030, Cl. 252-315.200.

Stezhko, Tatyana V.: *See—*
Granik, Vladimir G.; Stezhko, Tatyana V.; Glushkov, Robert G.; Mashkovsky, Mikhail D.; Roschina, Lidia F.; Polezhaeva, Antonina I.; Parimbetova, Roza B.; Bobkov, Jury G.; Losev, Alexandr S.; and Ivanova, Irina A., 4,876,360, Cl. 548-550.000.

Stichnote, Lynn K.: *See—*
Brewer, Terry L.; Hawley, Dan W.; Lamb, James E.; Latham, William J.; and Stichnote, Lynn K., 4,876,165, Cl. 430-7.000.

Stichting Instituut Voor Veeteeltkundig Onderzoek "Schoonoord": *See—*
Lambooy, Elbert, 4,875,253, Cl. 17-1.00E.

Stockrail Ltd.: *See—*
Duce, Edward, 4,875,416, Cl. 104-167.000.

Stopinc Aktiengesellschaft: *See—*
Keller, Werner, 4,875,606, Cl. 222-600.000.

Storace, Anthony: *See—*
Gasiunas, Donatas V.; Sette, Paul R.; and Storace, Anthony, 4,875,788, Cl. 400-163.100.

Storer, James A., to Data Compression Corporation. Stem for dynamically compressing and decompressing electronic data. 4,876,541, Cl. 341-51.000.

Storm, Eric L., to Eaton Corporation. Press-fit splined connection. 4,875,796, Cl. 403-359.000.

Strahan, Virgil H.: *See—*
Hughes, Arlen J.; and Strahan, Virgil H., 4,876,583, Cl. 357-23.700.

Strand, David: *See—*
Ross, Randall R.; Bjornard, Eric; and Strand, David, 4,876,667, Cl. 365-113.000.

Stringer, Hugh C.; and Montgomery, Larry D., to Bristol Compressors, Inc. Compressor shipping package. 4,875,580, Cl. 206-319.000.

Strippe, David C.: *See—*
Phinney, Richard R.; and Strippe, David C., 4,876,114, Cl. 427-45.100.

Stroede, Andrew J.: *See—*
Caveny, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 4,875,881, Cl. 439-535.000.

Strong, Russell W.: *See—*
Margerum, Edwin O.; and Strong, Russell W., 4,875,890, Cl. 460-68.000.

Stroze, Mark S.; and Reynolds, Richard W., to Sundstrand Corporation. Variable displacement port plate. 4,875,403, Cl. 91-482.000.

Stumfall, David M.: *See—*
Condon, David C.; and Stumfall, David M., 4,875,409, Cl. 101-93.290.

Stumpf, Jorg: *See—*
Moeckl, Ernst; Stumpf, Jorg; Hardt, Walter; and Doinghaus, Hermann, 4,875,418, Cl. 108-50.000.

Suda, Shoji: *See—*
Ariizumi, Ryozo; Kainuma, Masakuni; Suda, Shoji; Aoki, Toshikazu; Ejiri, Takashi; Kojima, Masao; and Hoshi, Mitsunori, 4,875,500, Cl. 137-596.180.

Sueda, Yutaka, to Mazda Motor Corporation. Steplessly variable transmission control for automotive vehicle. 4,875,892, Cl. 474-17.000.

Suenaga, Kazuhiro: *See—*
Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, 4,876,451, Cl. 361-540.000.

Suezaki, Isao: *See—*
Suzumura, Hiroyuki; Okamoto, Yuji; and Suezaki, Isao, 4,875,817, Cl. 411-171.000.

Sugano, Minoru: *See—*
Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, 4,876,681, Cl. 370-60.000.

Sugata, Hiroyuki: *See—*
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, 4,875,810, Cl. 406-14.000.

Sugata, Masao: *See—*
Chiba, Yuji; Ando, Kenji; Sugata, Masao; Sugata, Hiroyuki; Kimura, Toshiaki; and Osabe, Kuniji, 4,875,810, Cl. 406-14.000.

Sugathan, Kenneth: *See—*
Lee, Andrew J.; Sanduja, Mohan L.; Sugathan, Kenneth; Dragnea, Felicia; and Horowitz, Carl, 4,875,410, Cl. 101-170.000.

Sugimoto, Koichi: *See—*
Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, 4,875,618, Cl. 228-179.000.

Sugimoto, Tadao: *See—*
Miyasaka, Tsutomu; Okazaki, Masaki; and Sugimoto, Tadao, 4,876,183, Cl. 430-567.000.

Sugimoto, Yukinobu: *See—*
Arita, Masujiro; and Sugimoto, Yukinobu, 4,875,980, Cl. 203-14.000.

Sugita, Minoru; Nakatsuji, Teruyuki; Fujisaki, Tadashi; Sawaide, Minoru; Ishikawa, Noboru; and Inada, Yasuo, to Shimizu Construction Co., Ltd.; Dainihon Glass Industry Co., Ltd.; and Kyojin Rope Manufacturing Co., Ltd. Rod material. 4,876,143, Cl. 428-294.000.

Sugitani, Yuji; Sato, Yoshikazu; and Nishi, Yasuhiko, to NKK Corporation. Method for controlling a penetration bead. 4,876,432, Cl. 219-124.320.

Sugiyama, Genroku; Hirata, Toichi; and Satoh, Shinichi, to Hitachi Construction Machinery Co., Ltd. Construction machine dual-dump hydraulic circuit with piloted arm-boom cylinder supply priority switching valves. 4,875,337, Cl. 60-421.000.

Sugiyama, Toshinori; Ikegaki, Tetsurou; Shimizu, Mitsuru; and Tuburaya, Yoshitane, to Hitachi Maxell, Ltd. Optical data recording system and method of production of recording medium. 4,876,133, Cl. 428-64.000.

Suita, Yasunori: *See—*
Hisanaga, Yorisato; Shimokawa, Kazuhiro; Kawano, Toshihiko; Suita, Yasunori; and Yamashita, Tsuneo, 4,876,245, Cl. 514-29.000.

Sulger, Werner: *See—*
Daltrozzo, Ewald; and Sulger, Werner, 4,876,347, Cl. 546-176.000.

Sullivan, James P.: *See—*
Sremba, Gerald F.; Sremba, Patricia M.; and Sullivan, James P., 4,875,708, Cl. 281-45.000.

Sulzer Brothers Limited: *See—*
Gacsay, Lorant; and Meierhofer, Beat, 4,875,506, Cl. 139-450.000.

Sumen, Hiroyoshi: *See—*
Hara, Hitoshi; and Sumen, Hiroyoshi, 4,875,845, Cl. 425-143.000.

Sumitomo Chemical Company, Limited: *See—*
Ito, Iko; Toyoshima, Yoshiki; Takagishi, Hisao; and Takahashi, Tsutomu, 4,876,371, Cl. 549-517.000.
Mizutani, Masato; Shiroshita, Masao; Sakaki, Masaharu; Okuda, Hiroki; and Mito, Nobuaki, 4,875,924, Cl. 71-92.000.

Sumitomo Electric Industries, Ltd.: *See—*
Masuda, Shigeo; and Hosoya, Toshifumi, 4,875,758, Cl. 350-96.300.
Mizutani, Futoshi; Kyogoku, Takeshi; Saitoh, Tatsuo; and Endoh, Shigeki, 4,875,918, Cl. 65-3.120.

Sumitomo Heavy Industries, Ltd.: *See—*
Hara, Hitoshi; and Sumen, Hiroyoshi, 4,875,845, Cl. 425-143.000.

Sumitomo Special Metals, Co., Ltd.: *See—*
Wada, Toshiaki; Katsuyama, Yoshiaki; and Nakaoka, Junichi, 4,875,987, Cl. 204-192.150.

Sumiya, Kiyoshi: *See—*
Ishikawa, Osamu; and Sumiya, Kiyoshi, 4,876,605, Cl. 358-400.000.

Sun Room Designs, Inc.: *See—*
Meyers, Leo J., 4,875,311, Cl. 52-90.000.

Sunbeam Corporation: *See—*
Smith, Richard A., 4,876,475, Cl. 310-239.000.

Sunclipse, Inc.: *See—*
Cardenas, Alfonso, 4,875,737, Cl. 297-442.000.

Sundstrand Corporation: *See—*
Readman, John, 4,875,826, Cl. 415-89.000.
Stroze, Mark S.; and Reynolds, Richard W., 4,875,403, Cl. 91-482.000.

Sung, Rak M. Hula doll having compound motions. 4,875,886, Cl. 446-298.000.

Sunohara, Izuru: *See—*
Ohsawa, Hidefumi; Katayama, Akihiro; Hosokawa, Hiroshi; Sunohara, Izuru; and Yoshimoto, Masahiko, 4,876,610, Cl. 358-443.000.

Supra, Carl F. W., to Liberty Pool Products S.A. Apparatus for use with a pool cleaner. 4,876,001, Cl. 210-123.000.

Suresh, Dev D.: *See—*
DiCosimo, Robert; Burrington, James D.; and Suresh, Dev D., 4,876,348, Cl. 546-252.000.

Surrey Medical Imaging Systems Ltd.: *See—*
Taylor, David G., 4,876,508, Cl. 324-309.000.

Susa, Kenzo; Takagi, Kazumasa; Kobayashi, Toshio; Takayama, Takanobu; and Ohta, Norio, to Hitachi, Ltd. Single crystal thin film. 4,876,144, Cl. 428-336.000.

Sutherland, John W. H., Jr.: *See—*
Mack, Arthur R., II; and Sutherland, John W. H., Jr., 4,876,207, Cl. 436-135.000.

Suvanto, Erkki, to Neste Oy. Sleeve-mounted spike fitted on a vehicle tire. 4,875,515, Cl. 152-210.000.

Suzuki, Akinobu, to Mitsubishi Denki Kabushiki Kaisha. Optical semiconductor module using dummy ferrule. 4,875,752, Cl. 350-96.200.

Suzuki, Eiji, to Fujitsu Limited. Repeater for regenerating frame-multiplexed signal. 4,876,683, Cl. 370-97.000.

Suzuki, Isao: *See—*
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.

Suzuki, Masaru, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Electrical connecting apparatus for steering wheel and steering column. 4,875,860, Cl. 439-15.000.

Suzuki, Masaru, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Motor controlling switch device. 4,876,493, Cl. 318-293.000.

Suzuki, Masayuki, to Sony Corporation. Disk cartridge having shutter and a device for opening and closing the shutter. 4,876,619, Cl. 360-97.010.

Suzuki, Michio: *See*—
Hagiwara, Masayoshi; Suzuki, Michio; Sasaki, Ryoichi; Sugano, Minoru; Horiki, Akira; and Hayashi, Kazuyuki, 4,876,681, Cl. 370-60.000.

Suzuki, Miki: *See*—
Takeya, Fuminori; Fukuda, Naoya; and Suzuki, Miki, 4,875,970, Cl. 156-645.000.

Suzuki, Noboru; Toji, Shigeo; and Uenaka, Yukio, to Asahi Kogaku Kogyo Kabushiki Kaisha. Signal processing device for automatic-focusing video signal in electronically controlled photographic camera. 4,876,603, Cl. 358-227.000.

Suzuki, Nobuhiko; and Aoki, Tetuya, to Diesel Kiki Co., Ltd.; and Fujikoki Manufacturing Co., Ltd. Pressure control valve for variable displacement swash plate type compressor. 4,875,832, Cl. 417-222.000.

Suzuki, Osami, to Toshiba America, Inc. Personal sound system. 4,876,724, Cl. 381-187.000.

Suzuki, Satoshi: *See*—
Usami, Saburo; Uchiyama, Kyoichi; and Suzuki, Satoshi, 4,875,837, Cl. 417-407.000.

Suzuki, Shigeru; and Shimida, Shinichi, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling composite intake manifold system for internal combustion engine. 4,875,438, Cl. 123-52.0MB.

Suzuki, Shintaro: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,876,244, Cl. 514-19.000.

Suzuki, Toshio: *See*—
Okawa, Tadashi; and Suzuki, Toshio, 4,876,373, Cl. 556-453.000.

Suzuki, Yasuhito; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, to Canon Kabushiki Kaisha. Image recording apparatus. 4,876,562, Cl. 346-160.000.

Suzumura, Hiroyuki; Okamoto, Yuji; and Suezaki, Isao, to Toyota Jidosha Kabushiki Kaisha. Sealed weld nut. 4,875,817, Cl. 411-171.000.

Svensson, Kjell: *See*—
Holm, Sune, deceased; Malmberg, Rolf; and Svensson, Kjell, 4,876,100, Cl. 426-491.000.

Swanson, Scott C., to Sangamo Weston, Inc. Temperature transducer for KYZ pulse recorder. 4,875,783, Cl. 374-170.000.

Swartout, James J.: *See*—
Scott, William D.; and Swartout, James J., 4,875,399, Cl. 83-468.300.

Synaptics Incorporated: *See*—
Mead, Carver A.; and Allen, Timothy P., 4,876,534, Cl. 340-825.950.

Synthes (U.S.A.): *See*—
Comte, Pierre-Andre ; Schurch, Hans; and Ritter, Gebhard, 4,875,475, Cl. 128-924.00Y.

Szarka, Sandor, to Precision Screen Machines, Inc. Apparatus for mounting articles of clothing to a printing pallet. 4,875,268, Cl. 29-283.000.

Szema, Li-Chieh: *See*—
Rasmussen, Neil S.; Szema, Li-Chieh; and Abuaf, Nesim, 4,875,339, Cl. 60-757.000.

Tabuchi, Tsuyoshi: *See*—
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, 4,875,434, Cl. 118-52.000.

Tachi-S Co., Ltd.: *See*—
Yokoyama, Sho, 4,875,734, Cl. 297-284.000.

Tadokoro, Akio: *See*—
Akahoshi, Haruo; Murakami, Kanji; Kawamoto, Mineo; Tadokoro, Akio; and Yoshimura, Toyofusa, 4,876,177, Cl. 430-313.000.

Tadokoro, Michihiro: *See*—
Imai, Hitoshi; Okada, Kazuo; and Tadokoro, Michihiro, 4,876,666, Cl. 365-106.000.

Tadros, Tharwat F., to Imperial Chemical Industries PLC. Formulation process. 4,875,927, Cl. 71-94.000.

Taguchi, Kenichi: *See*—
Watanabe, Masataka; Ohhara, Nobuhiro; and Taguchi, Kenichi, 4,876,438, Cl. 219-497.000.

Tahara, Kazuo: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Taiyo Pharmaceutical Industry Co., Ltd.: *See*—
Nakaoku, Shozo; Sakuma, Kazuhiko; Oshika, Yasuhiro; and Ohira, Kazuo, 4,876,345, Cl. 544-379.000.

Tajika, Hiroshi: *See*—
Tajima, Hatsuo; Kubo, Takahiro; and Tajika, Hiroshi, 4,876,574, Cl. 355-253.000.

Tajima, Hatsuo; Kubo, Takahiro; and Tajika, Hiroshi, to Canon Kabushiki Kaisha. Developing apparatus. 4,876,574, Cl. 355-253.000.

Tajima, Kenji, to Fuji Photo Film Co., Ltd. Sheet film package. 4,876,706, Cl. 378-174.000.

Tak, Seung W. Portable container assembly for containing golf accessories. 4,875,579, Cl. 206-315.100.

Takagi, Akira; Oyaizu, Hirotsugu; Takahashi, Nobuatsu; and Kume, Kiyotaka, to Daiwa Kasei Kogyo Kabushiki Kausha. Cable tie. 4,875,647, Cl. 248-74.300.

Takagi, Kazumasa: *See*—
Susa, Kenzo; Takagi, Kazumasa; Kobayashi, Toshio; Takayama, Takanobu; and Ohta, Norio, 4,876,144, Cl. 428-336.000.

Takagi, Kozi: *See*—
Ozawa, Takashi; Tanaka, Hitoshi; Goshima, Takahiro; and Takagi, Kozi, 4,875,741, Cl. 303-116.000.

Takagishi, Hisao: *See*—
Ito, Iko; Toyoshima, Yoshiki; Takagishi, Hisao; and Takahashi, Tsutomu, 4,876,371, Cl. 549-517.000.

Takahashi, Hideo: *See*—
Hara, Junichiro; Ogihara, Yoshiyuki; and Takahashi, Hideo, 4,875,624, Cl. 236-49.500.

Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, to Fuji Photo Film Co., Ltd. Phosphor and radiation image storage panel. 4,876,161, Cl. 428-691.000.

Takahashi, Nobuatsu: *See*—
Takagi, Akira; Oyaizu, Hirotsugu; Takahashi, Nobuatsu; and Kume, Kiyotaka, 4,875,647, Cl. 248-74.300.

Takahashi, Tadashi: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Takahashi, Tsutomu: *See*—
Ito, Iko; Toyoshima, Yoshiki; Takagishi, Hisao; and Takahashi, Tsutomu, 4,876,371, Cl. 549-517.000.
Oshita, Saiichiro; Mouri, Toyohiko; Takahashi, Tsutomu; and Itou, Shinji, 4,875,541, Cl. 180-79.100.

Takahaski, Tsutomu: *See*—
Oshita, Saiichiro; Mouri, Toyohiko; and Takahaski, Tsutomu, 4,875,540, Cl. 180-79.100.

Takai, Kazuhiko: *See*—
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,875,834, Cl. 417-269.000.

Takaishi, Naotake: *See*—
Hori, Kimihiko; Nakamura, Koichi; Kawai, Michio; Motegi, Itsuro; Imokawa, Genji; and Takaishi, Naotake, 4,876,084, Cl. 424-62.000.

Takamatsu, Shuichi: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Takase, Haruo: *See*—
Abe, Akira; Nakajima, Junya; Takase, Haruo; Uenaka, Kazushige; and Otomo, Ruyzi, 4,876,180, Cl. 430-393.000.

Takashima, Masanobu: *See*—
Saeki, Keiso; Sano, Shojiro; Matsuoka, Katsumi; Takashima, Masanobu; and Iwakura, Ken, 4,876,233, Cl. 503-209.000.

Takasugi, Atsumi: *See*—
Ishii, Yoh; Abe, Masami; Harada, Yuhzoh; Takasugi, Atsumi; and Kato, Kazumi, 4,875,519, Cl. 164-465.000.

Takayama, Takanobu: *See*—
Susa, Kenzo; Takagi, Kazumasa; Kobayashi, Toshio; Takayama, Takanobu; and Ohta, Norio, 4,876,144, Cl. 428-336.000.

Takayama, Toshio, to Tokico, Ltd. Braking device for use in a motor vehicle. 4,875,740, Cl. 303-50.000.

Takechi, Kazuo: *See*—
Hirao, Yutaka; Takechi, Kazuo; Uriyu, Katuhiro; and Uemura, Yahiro, 4,876,088, Cl. 424-85.800.

Takeda Chemical Industries, Ltd.: *See*—
Morimoto, Akira; Choh, Nobuo; and Noguchi, Noriyoshi, 4,876,251, Cl. 514-193.000.
Shirafuji, Hideo; Yamaguchi, Takamasa; and Nogami, Ikuo, 4,876,195, Cl. 435-137.000.

Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; and Yamazaki, Tatsuo, to Kabushiki Kaisha Toshiba. Method of coating a nitride ceramic member. 4,876,119, Cl. 427-250.000.

Takeda, Kazuo; Ito, Yoshitoshi; Honma, Noriaki; and Munakata, Chusuke, to Hitachi, Ltd. Apparatus for measuring particles in liquid. 4,876,458, Cl. 250-574.000.

Takeda, Kiyoshi: *See*—
Funahashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Matsumoto, Makaoto, 4,876,363, Cl. 549-215.000.

Takeda, Renzo: *See*—
Aoyama, Motoo; Bessho, Yasunori; Uchikawa, Sadao; Takeda, Renzo; and Ishii, Yoshihiko, 4,876,062, Cl. 376-444.000.

Takehara, Tetsuo: *See*—
Oda, Noriyuki; Takehara, Tetsuo; Higashi, Katsumi; and Muramatsu, Keiji, 4,875,712, Cl. 285-47.000.

Takekado, Shigeru, to Kabushiki Kaisha Toshiba. Magnetic disc device with gimbal spring having variable elastic characteristics. 4,876,623, Cl. 360-104.000.

Takemura, Naoto; and Tanabe, Susumu, to Terumo Kabushiki Kaisha. Medical instrument and method for making. 4,876,126, Cl. 428-35.700.

Takenaka, Makoto: *See*—
Okuda, Hiroko; and Takenaka, Makoto, 4,875,400, Cl. 84-626.000.

Takeshima, Hideki: *See*—
Fujioka, Toyohiko; and Takeshima, Hideki, 4,875,280, Cl. 29-783.000.

Takeya, Fuminori; Fukuda, Naoya; and Suzuki, Miki, to NGK Insulators, Ltd. Method of forming recessed profile on ferrite single crystal by chemical etching. 4,875,970, Cl. 156-645.000.
Takiguchi, Tsuyoshi: *See*—
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.
Takita, Hidenori: *See*—
Kawabata, Akira; Terasaki, Yoshikazu; Inoue, Takashi; and Takita, Hidenori, 4,876,479, Cl. 313-440.000.
Tamagawa, Shigehisa; Kuroishi, Masayuki; and Fuchizawa, Tetsuro, to Fuji Photo Film Co., Ltd. Light-sensitive material comprising light-sensitive layer containing microcapsules provided on specific paper support. 4,876,170, Cl. 430-138.000.
Tampa Electric Company: *See*—
Colley, James D., 4,876,076, Cl. 423-242.000.
Tamura, Hiroki: *See*—
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.
Tamura, Michiya: *See*—
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.
Tamura, Susan Y.: *See*—
Asato, Goro; and Tamura, Susan Y., 4,876,272, Cl. 514-450.000.
Tamura, Tomoyuki: *See*—
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,876,042, Cl. 264-39.000.
Tanabe, Susumu: *See*—
Takemura, Naoto; and Tanabe, Susumu, 4,876,126, Cl. 428-35.700.
Tanabe, Takeshi: *See*—
Sakamoto, Yukio; Tanabe, Takeshi; Fukutani, Iwao; and Hori, Toshio, 4,875,862, Cl. 439-79.000.
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki. Substituted tetrahydroisoquinoline compounds and composition containing them. 4,876,261, Cl. 514-307.000.
Tanaka, Hitoshi: *See*—
Ozawa, Takashi; Tanaka, Hitoshi; Goshima, Takahiro; and Takagi, Kozi, 4,875,741, Cl. 303-116.000.
Tanaka, Junzo: *See*—
Mishima, Osamu; Yamaoka, Shinobu; Fukunaga, Osamu; Tanaka, Junzo; and Era, Koh, 4,875,967, Cl. 156-605.000.
Tanaka, Masanori, to Hosiden Electronics Co., Ltd. Telephone connector. 4,875,872, Cl. 439-344.000.
Tanaka, Osamu: *See*—
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, 4,875,947, Cl. 148-113.000.
Tanaka, Toshiaki: *See*—
Tsuchida, Hirofumi; Tanaka, Toshiaki; Oyamada, Akira; and Hirao, Sumio, 4,875,444, Cl. 123-270.000.
Tanaka, Toshinori; Miyazaki, Shigekazu; and Morishita, Akira, to Mitsubishi Denki Kabushiki Kaisha. Armature. 4,876,473, Cl. 310-216.000.
Tandem Computers Incorporated: *See*—
Sanner, Martin W., 4,876,701, Cl. 375-106.000.
Tani, Mitsukiyo: *See*—
Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, 4,875,618, Cl. 228-179.000.
Taniguchi, Hiroji: *See*—
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.
Taniguchi, Masato: *See*—
Akao, Shigeaki; and Taniguchi, Masato, 4,875,442, Cl. 123-90.390.
Taniguchi, Yuji; and Banju, Masaru, to Alps Electric Co., Ltd. Electroluminescent element. 4,876,481, Cl. 313-502.000.
Tapco Products Company, Inc.: *See*—
MacLeod, Richard J.; and Schiedegger, Charles E., 4,875,318, Cl. 52-211.000.
Tashima, Seiji: *See*—
Okimoto, Haruo; and Tashima, Seiji, 4,875,454, Cl. 123-559.300.
Tate, Kazuyuki: *See*—
Saegusa, Noboru; Hara, Toshihiro; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,876,708, Cl. 379-61.000.
Tateishi, Mataji: *See*—
Imoto, Koji; Tateishi, Mataji; Omura, Tadao; Nakajima, Kunihiko; Maekawa, Motoyuki; Matusyama, Moritake; and Tamura, Hiroki, 4,875,445, Cl. 123-292.000.
Tatsumi, Takashi: *See*—
Saitoh, Yoshiro; and Tatsumi, Takashi, 4,876,134, Cl. 428-73.000.
Tatsuzaki, Toru: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.
Tawada, Yoshihisa: *See*—
Hamakawa, Yoshihiro; Tawada, Yoshihisa; Tsuge, Kazunori; and Izumina, Masanobu, 4,875,943, Cl. 136-244.000.
Tayama, Suehiro: *See*—
Kurokawa, Satoshi; Tayama, Suehiro; and Sato, Fumio, 4,876,306, Cl. 524-423.000.
Taylor, Clive R., to British Aerospace plc. Electrostatic discharge protection circuit. 4,876,584, Cl. 357-23.130.
Taylor, Dale F., to General Electric Company. Corrosion resistant zirconium alloys containing bismuth. 4,876,064, Cl. 420-422.000.
Taylor, David G., to Surrey Medical Imaging Systems Ltd. Method and apparatus for NMR imaging. 4,876,508, Cl. 324-309.000.
Taylor, James M.; and Karner, Gary M., to Atlantic Richfield Company. Retractable dust control hood and guard for rotary table saw. 4,875,398, Cl. 83-100.000.
Taylor, Reginald M.; and Brock, Alan J., to Glyzinc Pharmaceuticals Limited. Zinc glycerolate complex and additions for pharmaceutical applications. 4,876,278, Cl. 514-494.000.
Tazartes, Daniel A.; Mark, John G.; and Matthews, Anthony, to Litton Systems, Inc. Apparatus and method for determining ring laser gyroscope phase at turnaround. 4,875,774, Cl. 356-350.000.
Tecon, Inc.: *See*—
Carlstedt, Kenneth T.; and Penn, Richard S., 4,876,598, Cl. 358-160.000.
Tecumseh Products Company: *See*—
Johnson, William C.; Richardson, Hubert, Jr.; and Barito, Thomas R., 4,875,840, Cl. 418-55.000.
Richardson, Hubert, Jr., 4,875,838, Cl. 418-55.000.
Teikoku Seiyaku Kabushiki Kaisha: *See*—
Mizobuchi, Tadafumi; Ohji, Akihito; Sakoh, Seiichi; and Muguruma, Yasuyoshi, 4,876,092, Cl. 424-435.000.
Tekamp-Olson, Patricia A.: *See*—
Burke, Rae Lyn; Rosenberg, Steven; Shuster, Jeffrey R.; Tekamp-Olson, Patricia A.; and Valenzuela, Pablo D. T., 4,876,197, Cl. 435-172.300.
Tekna, Inc.: *See*—
Osterhout, Ralph F.; Howard, Paul L.; and Light, Greta G., 4,876,632, Cl. 362-183.000.
Tektronix, Inc.: *See*—
Carlton, Dale E.; Baker, Clifford E.; and Henricksen, Ronald M., 4,876,655, Cl. 364-487.000.
Hoo, Kee K., 4,875,867, Cl. 439-157.000.
Mitchell, Roy O.; Klaudt, Milton D.; and Ullom, Kathleen F. M., 4,876,484, Cl. 315-94.000.
Yamaguchi, Tadanori; Patton, Evan; Lane, Eric; and Yu, Simon, 4,876,214, Cl. 437-038.000.
Telecommunications Radioelectriques et Telephoniques: *See*—
Boisson, Jean-Yves; and Bastien, Jean-Paul, 4,876,698, Cl. 375-25.000.
Telectronics, N.V.: *See*—
Vollmann, William; and Mumford, Van E., 4,875,483, Cl. 128-419.0PG.
Teledyne Industries, Inc.: *See*—
Krnan, Palo, 4,875,546, Cl. 181-160.000.
Telefind Corp.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,876,538, Cl. 340-825.260.
Tennant Company: *See*—
Field, Bruce F., 4,876,444, Cl. 250-214.0AL.
Tenud, Leander: *See*—
McGarrity, John; and Tenud, Leander, 4,876,350, Cl. 548-110.000.
Teradyne, Inc.: *See*—
Rich, Marc A., 4,876,685, Cl. 371-21.600.
Terakawa, Taiju: *See*—
Nakajima, Sadaaki; and Terakawa, Taiju, 4,875,844, Cl. 425-131.500.
Terasaki, Yoshikazu: *See*—
Kawabata, Akira; Terasaki, Yoshikazu; Inoue, Takashi; and Takita, Hidenori, 4,876,479, Cl. 313-440.000.
Terauchi, Kiyoshi: *See*—
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,875,834, Cl. 417-269.000.
Terauchi, Toshiro: *See*—
Makagami, Tarp; Fukami, Takeshi; and Terauchi, Toshiro, 4,876,719, Cl. 381-1.000.
Terazono, Takeshi: *See*—
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, 4,875,434, Cl. 118-52.000.
Terumo Kabushiki Kaisha: *See*—
Takemura, Naoto; and Tanabe, Susumu, 4,876,126, Cl. 428-35.700.
Tetreault, Albert G. Lead arm strap for baseball hitters. 4,875,677, Cl. 273-26.00C.
Texaco Chemical Company: *See*—
Knifton, John F.; and Grice, Neal J., 4,876,397, Cl. 568-798.000.
Texaco Inc.: *See*—
Alexander, David C., 4,876,358, Cl. 548-521.000.
Apel, Howard L., 4,875,906, Cl. 48-197.00R.
Najjar, Mitri S.; and Corbeels, Roger J., 4,876,031, Cl. 252-373.000.
Texas Alkyls, Inc.: *See*—
Malpass, Dennis B.; Triplett, Kelly B.; and Piotrowski, Andrzej M., 4,876,318, Cl. 525-446.000.
Piotrowski, Andrzej M.; and Ligi, Joseph J., 4,875,941, Cl. 134-11.000.
Texas Instrument Incorporated: *See*—
Luttmer, Joseph D.; and Little, D. Dawn, 4,876,222, Cl. 437-225.000.
Texas Instruments Incorporated: *See*—
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Abernathy, Joe V.; and Wooldridge, Timothy A., 4,875,989, Cl. 204-298.000.

Kushida, Osami; Ninomiya, Hisamitsu; Nezuka, Masakazu; and Ishikawa, Yoshihiko, 4,876,523, Cl. 337-299.000.
Norwood, Roger D.; Chun, Jino; and Patel, Pravin P., 4,876,671, Cl. 365-233.000.
Thackston, Clyde D., to Allen-Bradley Company, Inc. Torque control actuator. 4,875,528, Cl. 173-12.000.
Thakoor, Anilkumar P.; Lambe, John; and Moopen, Alexander, to California Institute of Technology. Thin film memory matrix using amorphous and high resistive layers. 4,876,668, Cl. 365-163.000.
Thau, Wolfgang, to Magna International Inc. Compensating escutcheon plate for car door. 4,875,726, Cl. 292-337.000.
Theeuwes, Felix; and Wong, Patrick S. L., to ALZA Corporation. Dispenser with dispersing member for delivering beneficial agent. 4,876,093, Cl. 424-438.000.
Thelen, Gary F.: *See—*
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,876,538, Cl. 340-825.260.
Theobald, Hans: *See—*
Himmele, Walter; Theobald, Hans; Merger, Franz; Hofmann, Ernst; Kuenast, Christoph; and Hofmeister, Peter, 4,876,275, Cl. 514-452.000.
Thermit Australia Pty. Limited: *See—*
Moller, Ronald H.; and Batty, Alan K., 4,875,657, Cl. 249-86.000.
Thoese, Klaus; and Jung, Karl-Heinz, to Hoechst Aktiengesellschaft. Polyester film. 4,876,155, Cl. 428-480.000.
Thoma, Wilhelm: *See—*
Noll, Klaus; Thoma, Wilhelm; Nachtkamp, Klaus; Schroer, Walter; and Pedain, Josef, 4,876,302, Cl. 524-267.000.
Thomas & Betts Corporation: *See—*
O'Loughlin, Francis A., 4,875,876, Cl. 439-431.000.
Thomas, Gunther: *See—*
Franckowiak, Gerhard; Kayser, Michael; Schramm, Matthias; Thomas, Gunther; Gross, Rainer; Perzborn, elisabeth; and Seuter, Friedel, 4,876,254, Cl. 514-252.000.
Franckowiak, Gerhard; Rosentreter, Ulrich; Perzborn, Elisabeth; Seuter, Friedel; Kayser, Michael; and Thomas, Gunther, 4,876,255, Cl. 514-252.000.
Thomka, Donald E.: *See—*
Nowicki, Neal R.; and Thomka, Donald E., 4,876,385, Cl. 562-414.000.
Thompson, Eldon J.: *See—*
Dawson, John F.; Thompson, Eldon J.; and Cousens, James A., 4,876,651, Cl. 364-449.000.
Thompson, Mark L.: *See—*
Hinduja, Murli; Thompson, Mark L.; and Spriggs, John R., 4,875,363, Cl. 73-56.000.
Thomson-CGR: *See—*
Aubert, Guy, 4,876,503, Cl. 324-117.00R.
Thomson-CSF: *See—*
Cachier, Gerard, 4,876,239, Cl. 505-1.000.
Thorfinnson, Bradley S., to BASF Corporation. Process for the preparation of cyanate resin-based prepregs and films which maintain their tack. 4,876,153, Cl. 428-447.000.
Thorn Emi plc: *See—*
Best, Stuart J.; and Willard, Reginald A., 4,876,617, Cl. 360-60.000.
Thornburrow, Edward T., to Cameron Iron Works USA, Inc. Pipeline servicing tool. 4,875,523, Cl. 166-77.000.
Tiedemann, William H.: *See—*
Brilmyer, George H.; and Tiedemann, William H., 4,876,513, Cl. 324-427.000.
Tien, Li C.: *See—*
Meister, Bernard J.; Dryzga, Craig D.; and Tien, Li C., 4,876,312, Cl. 525-263.000.
Tiger Electronics, Inc.: *See—*
Arad, Avi; and Kennedy, Melvin R., 4,875,675, Cl. 272-74.000.
Tighe, Laurence E.; and Parker, Tim, to Dennison Manufacturing Company. Localized microwave radiation heating. 4,876,423, Cl. 219-10.55E.
Tikkanen, Tim, to Panel International Ltd. p.l.c. Sieve plate. 4,876,008, Cl. 210-498.000.
Tillyard, Malcolm: *See—*
Hanson, Raymond; Tillyard, Malcolm; and Allen, Christopher M., 4,876,434, Cl. 219-215.000.
Timms, Herbert. Electronic bingo games system network and components therefor. 4,875,686, Cl. 273-237.000.
Tjurin, Jury G.: *See—*
Khutoretsky, Garri M.; Tjurin, Jury G.; Varshavsky, Vladimir D.; Zagorodnaya, Galina A.; and Fridman, Vladimir M., 4,876,469, Cl. 310-52.000.
Tobias, Eric; and Chen, Chau-Shiong A., to Applied Micro Circuits Corporation. Semiconductor integrated circuit manufacturing process providing oxide-filled trench isolation of circuit devices. 4,876,216, Cl. 437-67.000.
Toda, Kenichi; and Hori, Tetsuhiro, to Kabushiki Kaisha Polyurethane Engineering. Mixing apparatus for synthetic resin with multiple resin components. 4,876,071, Cl. 422-133.000.
Toji, Shigeo: *See—*
Suzuki, Noboru; Toji, Shigeo; and Uenaka, Yukio, 4,876,603, Cl. 358-227.000.
Tojima, Hitoshi: *See—*
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.
Tojo, Nobuo, to Maruyama Mfg. Co. Inc. Seal device for reciprocating pump. 4,875,690, Cl. 277-12.000.
Tokico Ltd.: *See—*
Imaizumo, Tomio, 4,875,560, Cl. 188-319.000.
Takayama, Toshio, 4,875,740, Cl. 303-50.000.
Tokyo Electric Co., Ltd.: *See—*
Matsumoto, Yasuo; Murakami, Kazunori; Ikumi, Tomonori; and Iwafune, Yasuo, 4,875,748, Cl. 350-6.800.
Tolan, Peter: *See—*
Steele, Donald F.; Hoagland, Lawrence C.; Kyricos, Christopher; and Tolan, Peter, 4,875,520, Cl. 165-10.000.
Tolman, Richard L.: *See—*
Coss, Malcolm M.; and Tolman, Richard L., 4,876,256, Cl. 514-252.000.
Tomisawa, Naoki, to Japan Electronic Control Systems Company Limited. Self-diagnosis system for auxiliary air control system of internal combustion engine. 4,875,456, Cl. 123-585.000.
Tomko, George J., to Mytec Technologies Inc. Method and apparatus for fingerprint verification. 4,876,725, Cl. 382-4.000.
Tomlin, James S.: *See—*
Rudy, Norman A.; and Tomlin, James S., 4,875,254, Cl. 17-61.000.
Tomosada, Kenji; Kondo, Toshiro; Yamamoto, Tadanobu; and Hashino, Hiroshi, to Mazda Motor Corporation. Front wheel suspension stabilizer mounting structure. 4,875,704, Cl. 280-695.000.
Tongaat-Hulett Group Limited, The: *See—*
Radford, David J., 4,875,940, Cl. 127-2.000.
Topfer, Lothar: *See—*
Waschke, Christine; Topfer, Lothar; and Rath, Alfred, 4,875,477, Cl. 128-206.210.
Toppan Moore Company, Ltd.: *See—*
Mochizuki, Seiji; and Kato, Fumiyasu, 4,875,633, Cl. 242-58.300.
Toray Silicone Company, Ltd.: *See—*
Okawa, Tadashi; and Suzuki, Toshio, 4,876,373, Cl. 556-453.000.
Torgrimson, Lee A.; and Chinske, Louis M. Mixing kit. 4,875,576, Cl. 206-219.000.
Torita, Fumio; Ikeda, Naotaka; Nakamura, Kimihiko; Matsuo, Katsuharu; Hotta, Tomio; and Makino, Yoshiyuki, to Kabushiki Kaisha Toshiba. Automatic detergent dispenser apparatus having synchronous motor drive. 4,875,607, Cl. 222-643.000.
Torley, Lawrence W.; Johnson, Bernard D.; and Dusza, John P., to American Cyanamid Company. 4,5,6-substituted-N-(substituted-phenyl)-2-pyrimidinamines. 4,876,252, Cl. 514-224.800.
Torrez, Gerald: *See—*
Guyomard, Daniel; Torrez, Gerald; Lambour, Jean-Michel; and Arriveau, Claude, 4,876,111, Cl. 427-31.000.
Torrington Company, The: *See—*
Santos, Alfred J.; Cook, Frederick A., Jr.; Duncan, Scott M.; and Moseley, John, 4,875,785, Cl. 384-448.000.
Toshiba America, Inc.: *See—*
Suzuki, Osami, 4,876,724, Cl. 381-187.000.
Toshiba Silicone Co., Ltd.: *See—*
Funahashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Matsumoto, Makaoto, 4,876,363, Cl. 549-215.000.
Totake, Yukinori: *See—*
Okuda, Akihiko; Totake, Yukinori; and Matsumura, Hideki, 4,876,407, Cl. 570-239.000.
Total Human Medical Laboratory Co., Ltd.: *See—*
Anzai, Hiroshi; and Futauki, Atsunori, 4,875,484, Cl. 128-421.000.
Toth, Bela: *See—*
Csajtai, Geza; Doleschall, Sandor; Milley, Gyula; Kristof, Miklos; Paal, Tibor; Racz, Daniel; and Toth, Bela, 4,875,809, Cl. 405-263.000.
Toyama, Masamichi: *See—*
Amikura, Takashi; Fujiwara, Akihiro; Toyama, Masamichi; Ueda, Kouichi; and Kozuki, Susumu, 4,876,564, Cl. 354-400.000.
Toyo Boseki Kabushiki Kaisha: *See—*
Isaka, Tsutomu; and Ohta, Saburo, 4,876,146, Cl. 428-347.000.
Toyo Seikan Kaisha, Ltd.: *See—*
Yamada, Muneki; and Kawaguchi, Kiyoshi, 4,876,052, Cl. 264-148.000.
Toyokawa, Yasufumi: *See—*
Matsuzawa, Masafumi; Hokari, Hiroshi; Kusano, Shoji; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,875,930, Cl. 71-106.000.
Toyoshima, Yoshiki: *See—*
Ito, Iko; Toyoshima, Yoshiki; Takagishi, Hisao; and Takahashi, Tsutomu, 4,876,371, Cl. 549-517.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
Hayashi, Kotaro; Ito, Sumio; and Kobashi, Kiyoshi, 4,875,336, Cl. 60-286.000.
Inui, Masaki; Okuda, Shozo; and Hosono, Masaki, 4,875,566, Cl. 192-53.00F.
Kato, Eiji; Kadotani, Masanori; Sakaguchi, Yoshikazu; Kubo, Seitoku; Iwatsuki, Kunihiro; Taniguchi, Hiroji; and Harada, Yoshihara, 4,875,665, Cl. 267-170.000.
Suzumura, Hiroyuki; Okamoto, Yuji; and Suezaki, Isao, 4,875,817, Cl. 411-171.000.
Trahan, David O.; and Faulk, Michael B. Use of polyalphalolefin in downhole drilling. 4,876,017, Cl. 252-8.510.
Travers, Barbara E. Infusion package. 4,875,574, Cl. 206-0.500.
Traxler, Peter: *See—*
Kump, Wilhelm; and Traxler, Peter, 4,876,258, Cl. 514-254.000.
Trebino, Rick: *See—*
Gustafson, Eric K.; Trebino, Rick; and Lee, John, 4,876,208, Cl. 436-531.000.
Treestone Corporation: *See—*
Eichen, Howard R., 4,876,151, Cl. 428-446.000.
Tremblay, Gilles, to Futonair Quebec, Inc. Sofa bed construction. 4,875,244, Cl. 5-37.00R.

Triad Direct Incorporated: *See—*
Chickering, Robert; and Barabino, William A., 4,875,602, Cl. 222-187.000.

Trimble, Harold: *See—*
Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 4,875,995, Cl. 208-152.000.

Trimble, Larry J. Hanging shower caddy. 4,875,593, Cl. 211-95.000.

Triplett, Kelly B.: *See—*
Malpass, Dennis B.; Triplett, Kelly B.; and Piotrowski, Andrzej M., 4,876,318, Cl. 525-446.000.

Tronel, Jean-Claude: *See—*
Climent, Jean-Pierre; Petelet, Georges; and Tronel, Jean-Claude, 4,876,551, Cl. 342-460.000.

Trotta, Robert A.; and Cerier, Jeffrey C., to Gillette Company, The. Shaving device. 4,875,288, Cl. 30-49.000.

Trousdell, Edmund D.; and Kasprow, Robert F., to United Technologies Corporation. Flanged ladder seal. 4,875,830, Cl. 416-215.000.

Trubac, Robert E.: *See—*
Nagji, Moez M.; and Trubac, Robert E., 4,876,394, Cl. 568-697.000.

True Manufacturing Co., Inc.: *See—*
Trulaske, Arthur W., 4,875,745, Cl. 312-298.000.

Trulaske, Arthur W., to True Manufacturing Co., Inc. Latch for cooler. 4,875,745, Cl. 312-298.000.

Trumper, Jacob: *See—*
Issachar, David; Trumper, Jacob; and Abrashkin, Shmuel, 4,876,073, Cl. 423-2.000.

TRW Inc.: *See—*
Leibowitz, Joseph D., 4,875,282, Cl. 29-830.000.

Tseng, Samuel C., to International Business Machines Corporation. Complex character generator utilizing byte scanning. 4,876,607, Cl. 358-261.200.

TSI Incorporated: *See—*
Borgos, John A.; Bradac, Francis; Haumschild, Daniel J.; Johnson, Timothy; and Lee, Rebecca, 4,875,755, Cl. 350-96.200.

Tsilibary, Effie C.; and Furcht, Leo T., to Univeristy of Minnesota, Regents of the. Polypeptides with type IV collagen activity. 4,876,332, Cl. 530-326.000.

Tsuboi, Shinichi: *See—*
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,876,263, Cl. 514-338.000.

Tsuchida, Hirofumi; Tanaka, Toshiaki; Oyamada, Akira; and Hirao, Sumio, to Nissan Motor Co., Ltd. Swirl chamber for diesel engines and the like. 4,875,444, Cl. 123-270.000.

Tsuchida, Nobuo: *See—*
Ishiwa, Hiromi; Shibahara, Harue; Mutai, Masahiko; and Tsuchida, Nobuo, 4,876,202, Cl. 435-320.000.

Tsuchiya, Atsushi: *See—*
Uchiyama, Yoshichika; and Tsuchiya, Atsushi, 4,875,932, Cl. 73-202.000.

Tsuge, Kazunori: *See—*
Hamakawa, Yoshihiro; Tawada, Yoshihisa; Tsuge, Kazunori; and Izumina, Masanobu, 4,875,943, Cl. 136-244.000.

Tsukahara, Hitoshi; Kurokawa, Keiko; Tsukui, Toshimitsu; and Nagai, Toshitake, to Sanyo Electric Co., Ltd. Air blower apparatus. 4,876,070, Cl. 422-122.000.

Tsukamoto, Kimihide: *See—*
Ogura, Mitsuru; and Tsukamoto, Kimihide, 4,876,577, Cl. 355-315.000.

Tsukamoto, Sakae, to Yazaki Corporation. Illumination meter dial device. 4,875,433, Cl. 116-335.000.

Tsukui, Toshimitsu: *See—*
Tsukahara, Hitoshi; Kurokawa, Keiko; Tsukui, Toshimitsu; and Nagai, Toshitake, 4,876,070, Cl. 422-122.000.

Tsukumo, Noriko: *See—*
Yamane, Akio; Kawasoe, Tatsuro; Tsukumo, Noriko; and Miyoshi, Kenichi, 4,876,335, Cl. 536-27.000.

Tsunoda, Kazuyuki: *See—*
Matai, Masahiro; and Tsunoda, Kazuyuki, 4,876,536, Cl. 340-825.440.

Tsuruta, Masao: *See—*
Naruo, Kyoichi; Ohtani, Sumio; Etoh, Masahiro; Tsuruta, Masao; Moriya, Ikuro; Ishiguro, Masanori; and Matsumoto, Akira, 4,876,007, Cl. 210-339.000.

Tsutsumi, Michinari: *See—*
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, 4,875,434, Cl. 118-52.000.

Tsuzuki, Ryuji: *See—*
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,876,261, Cl. 514-307.000.

Tubbs, Duane G., to Qualcomm, Inc. Pillbox antenna and antenna assembly. 4,876,554, Cl. 343-780.000.

Tuburaya, Yoshitane: *See—*
Sugiyama, Toshinori; Ikegaki, Tetsurou; Shimizu, Mitsuru; and Tuburaya, Yoshitane, 4,876,133, Cl. 428-64.000.

Tucker, Terry L.: *See—*
Orsburn, Michael L.; Hemsky, Robert L.; Tucker, Terry L.; Schwarz, Robert E.; and Fearing, Craig F., 4,876,589, Cl. 358-22.000.

Tufts University: *See—*
Goldner, Ronald B.; Haas, Terry; Wong, Kwok-Keung; and Seward, George, 4,876,628, Cl. 361-313.000.

Tullis, Barclay J.; Bailey, John S.; Gunawardena, D. R.; and Kaempf, Ulrich, to Hewlett-Packard Company. Method for automated cassette handling. 4,875,825, Cl. 414-786.000.

Turner, Lanny. Random lotto marker. 4,875,411, Cl. 101-333.000.

Turner, Reed J.; Peters, Loren W.; Wilson, John E.; and Bennett, Robert E., to Deere & Company. Separating grate for a grain harvester. 4,875,891, Cl. 460-110.000.

Tusbakimoto Chain Co.: *See—*
Kyoo, Takatsugu, 4,875,570, Cl. 198-408.000.

Tusting, Robert F., to Harbor Branch Oceanographic Institution, Inc. Apparatus and method of underwater optical recording. 4,876,565, Cl. 354-403.000.

Tuttle, John E.; and Ewing, Sheldon M. Card case with powered dispenser. 4,875,599, Cl. 221-231.000.

Twerdochlib, Michael, to Westinhouse Electric Corp. Temperature compensated fiber optic vibration sensor. 4,875,373, Cl. 73-655.000.

Tzikas, Athanassios; and Herzig, Paul, to Ciba-Geigy Corporation. Triazinyl reactive dyes in which the triazinyl is furter substituted with a reactive radical. 4,876,334, Cl. 534-632.000.

U.S.C.: *See—*
Forrest, Stephen R., 4,876,209, Cl. 437-5.000.

Uchida, Koh; Kurihara, Takashi; and Miyoshi, Makoto, to Nissan Motor Co., Ltd. Hydraulic system for variable assist power steering system. 4,875,542, Cl. 180-142.000.

Uchikawa, Sadao: *See—*
Aoyama, Motoo; Bessho, Yasunori; Uchikawa, Sadao; Takeda, Renzo; and Ishii, Yoshihiko, 4,876,062, Cl. 376-444.000.

Uchiya Termostat Co.: *See—*
Kanezawa, Nobuyoshi, 4,876,422, Cl. 200-302.100.

Uchiyama, Kyoichi: *See—*
Usami, Saburo; Uchiyama, Kyoichi; and Suzuki, Satoshi, 4,875,837, Cl. 417-407.000.

Uchiyama, Shintaro, to Fuji Jukogyo Kabushiki Kaisha. Power transmitting system for a four-wheel drive vehicle. 4,875,698, Cl. 180-233.000.

Uchiyama, Yoshichika; and Tsuchiya, Atsushi, to Cosmo Instruments Co., Ltd. Apparatus for measuring a flow rate. 4,875,932, Cl. 73-202.000.

Udd, Eric: *See—*
Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., 4,875,775, Cl. 356-350.000.

Udovich, Carl A., to Amoco Corporation. Oxidative alkoxycarbonylation of amines and amine derivatives. 4,876,379, Cl. 560-158.000.

Ueda, Kouichi: *See—*
Amikura, Takashi; Fujiwara, Akihiro; Toyama, Masamichi; Ueda, Kouichi; and Kozuki, Susumu, 4,876,564, Cl. 354-400.000.

Ueda, Makoto: *See—*
Yoshioka, Ritsuo; Ueda, Makoto; Motora, Yoichi; and Nakamura, Mitsuharu, 4,876,060, Cl. 376-333.000.

Ueda, Nobuo: *See—*
Hirasawa, Hideaki; and Ueda, Nobuo, 4,875,768, Cl. 353-27.00A.

Uehara, Mikio: *See—*
Aoyama, Takeo; Imai, Teruo; Hattori, Junichi; and Uehara, Mikio, 4,876,049, Cl. 264-49.000.

Uemura, Yahiro: *See—*
Hirao, Yutaka; Takechi, Kazuo; Uriyu, Katuhiro; and Uemura, Yahiro, 4,876,088, Cl. 424-85.800.

Uenaka, Kazushige: *See—*
Abe, Akira; Nakajima, Junya; Takase, Haruo; Uenaka, Kazushige; and Otomo, Ruyzi, 4,876,180, Cl. 430-393.000.

Uenaka, Yukio: *See—*
Suzuki, Noboru; Toji, Shigeo; and Uenaka, Yukio, 4,876,603, Cl. 358-227.000.

Ullom, Kathleen F. M.: *See—*
Mitchell, Roy O.; Klaudt, Milton D.; and Ullom, Kathleen F. M., 4,876,484, Cl. 315-94.000.

Umemaru, Hisato: *See—*
Morishita, Mitsuharu; Kohge, Shinichi; Hara, Tadayuki; Hata, Yasuaki; and Umemaru, Hisato, 4,875,367, Cl. 73-118.100.

Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, to Zaidan Hojin Biseibutsu Kagaku. Medical composition for injection containing a spergualin as active ingredient and process for preparing the same. 4,876,244, Cl. 514-19.000.

Underwood, Gary; and Graham, Robert G., to Ensyn Engineering Associates Inc. Method of using fast pyrolysis liquids as liquid smoke. 4,876,108, Cl. 426-650.000.

Unilever Patent Holdings BV: *See—*
King, David M.; and Padley, Frederick B., 4,876,107, Cl. 426-601.000.

Unimation, Inc.: *See—*
Daggett, Kenneth E.; Onaga, Eimei M.; and Casler, Richard J., Jr., 4,876,494, Cl. 318-568.220.

Union Carbide Chemicals and Plastics Company Inc.: *See—*
Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,876,320, Cl. 526-62.000.
Logsdon, John E.; Loke, Richard A.; Merriam, Jay S.; and Voight, Richard W., 4,876,402, Cl. 568-881.000.

Union Carbide Corporation: *See—*
Orac, Thomas H.; Quandt, Herbert C.; and Ball, David R., 4,875,979, Cl. 201-5.000.

Union Generale De Savonnerie: *See—*
D'Hoogue, Martial; Perrette, Claude; and Goffinet, Pierre, 4,875,600, Cl. 222-52.000.

Union Oil Company of California: *See—*
Ratcliffe, Charles T.; and Ward, John W., 4,876,408, Cl. 585-467.000.

United Kingdom Atomic Energy Authority: *See—*
Clayton, Colin G.; and Spackman, Ramon, 4,876,056, Cl. 376-152.000.
Conroy, Peter J., 4,876,059, Cl. 376-247.000.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Majesty's Government of the: *See—*
Smith, Gilbert W.; Daniel, Mervyn F.; Barton, John W.; and Ratcliffe, Norman M., 4,876,150, Cl. 428-411.100.

United States of America
Air Force: *See—*
Hughes, Arlen J.; and Strahan, Virgil H., 4,876,583, Cl. 357-23.700.
Army: *See—*
Bramley, Jenny, 4,876,692, Cl. 372-70.000.
Mishra, Indu B.; and Vande Kieft, Lawrence J., 4,875,949, Cl. 149-19.300.
Energy: *See—*
Liepins, Raimond; Jorgensen, Betty S.; and Liepins, Leila Z., 4,876,032, Cl. 252-500.000.
Murphy, Lawrence M., 4,875,467, Cl. 126-424.000.
Paulson, Leland E., 4,876,080, Cl. 423-648.100.
Raistrick, Ian D., 4,876,115, Cl. 427-115.000.
Wang, Francis; and Velsko, Stephan P., 4,876,688, Cl. 372-22.000.
National Aeronautics and Space Administration: *See—*
Jones, Jack A.; Wen, Liang-Chi; and Bard, Steven, 4,875,346, Cl. 62-467.000.
Navy: *See—*
Giallorenzi, Thomas G., 4,875,357, Cl. 73-27.00A.

U.S. Philips Corporation: *See—*
Lindenmeier, Karl-Heinz G.; and Flachenecker, Gerhard, 4,876,743, Cl. 455-133.000.
Selby, Geoffrey R., 4,876,738, Cl. 455-33.000.
Simons, Johannes M. M., 4,876,319, Cl. 525-456.000.
Veldhuis, Raymond N. J., 4,876,595, Cl. 358-136.000.

U.S. Philips Ltd.: *See—*
Van Vaals, Johannes J., 4,876,507, Cl. 324-307.000.

United States Tennis Association Incorporated: *See—*
Hass, Hyman, 4,876,658, Cl. 364-550.000.

United Steel & Wire Company: *See—*
Badger, Ronald L.; and Pejakovich, Michael, 4,875,695, Cl. 280-33.993.

United Technologies Corporation: *See—*
McElroy James F., 4,876,162, Cl. 429-13.000.
Trousdell, Edmund D.; and Kasprow, Robert F., 4,875,830, Cl. 416-215.000.

Univeristy of Minnesota, Regents of the: *See—*
Tsilibary, Effie C.; and Furcht, Leo T., 4,876,332, Cl. 530-326.000.

Universal Industrial Products., a Division of Core Industries, Inc.: *See—*
Falconer, Donald R.; and Sneddon, James C., 4,875,252, Cl. 16-288.000.

University of California, Regents of: *See—*
Lee, Garrett, 4,875,897, Cl. 604-283.000.
Palmer, Christopher J.; and Casida, John E., 4,876,274, Cl. 514-452.000.

University of Delaware, The: *See—*
Barnett, Allen M.; and Zolper, John C., 4,876,210, Cl. 437-5.000.

University of Florida, The: *See—*
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.

University of Iowa Research Foundation: *See—*
Wu, Han-Chin; and Xu, Zhiyou, 4,875,375, Cl. 73-795.000.

University of Minnesota, Regents of the: *See—*
Liu, Benjamin Y. H.; and Ramsey, James W., 4,875,340, Cl. 62-50.200.

UOP: *See—*
McCulloch, Beth, 4,876,390, Cl. 568-34.000.
Nagji, Moez M.; and Trubac, Robert E., 4,876,394, Cl. 568-697.000.

Urata, Kaoru; Nakashio, Miaki; Ono, Koichi; Hirai, Hitoshi; and Iwamoto, Masayuki, to Sony Corp. Apparatus for compressing and/or expanding time base. 4,876,703, Cl. 377-62.000.

Urban, Frank J., to Pfizer Inc. Macrocyclic polyether carboxylic acids. 4,876,367, Cl. 549-349.000.

Uriyu, Katuhiro: *See—*
Hirao, Yutaka; Takechi, Kazuo; Uriyu, Katuhiro; and Uemura, Yahiro, 4,876,088, Cl. 424-85.800.

Usami, Jun; Hattori, Akinobu; and Sasaki, Yuichi, to NGK Insulators, Ltd. Oxygen analyzing method and device. 4,875,981, Cl. 204-1.00T.

Usami, Jun: *See—*
Kodachi, Toru; and Usami, Jun, 4,875,990, Cl. 204-408.000.

Usami, Saburo; Uchiyama, Kyoichi; and Suzuki, Satoshi, to Hitachi, Ltd. Two-flow-passage type exhaust gas driven turbo-charger. 4,875,837, Cl. 417-407.000.

Ushioda, Makoto: *See—*
Saito, Shinichi; Inoue, Hiromichi; Miyazawa, Kazutoshi; Ohno, Kouji; and Ushioda, Makoto, 4,876,026, Cl. 252-299.610.

Ushiroguchi, Tsuyoshi: *See—*
Yoshida, Susumu; Nakagawa, Shizutoshi; Ushiroguchi, Tsuyoshi; Matsuura, Hiromichi; and Yazaki, Akira, 4,876,281, Cl. 514-517.000.

Usinger, Patricia: *See—*
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans G.; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 4,876,354, Cl. 548-341.000.

Usui Kokusai Sangyo Kaisha Ltd.: *See—*
Watanabe, Ikuo, 4,875,711, Cl. 285-45.000.

Utah Scientific Advanced Development Center, Inc.: *See—*
Orsburn, Michael L.; Hemsky, Robert L.; Tucker, Terry L.; Schwarz, Robert E.; and Fearing, Craig F., 4,876,589, Cl. 358-22.000.

Utsumi, Shigeo, to Diafoil Company, Limited. Polyethylene naphthalate film for high-density magnetic recording media of floppy disk. 4,876,137, Cl. 428-141.000.

Utyamyshev, Rustam I.: *See—*
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.

Vacon, Gary; and Liu, James J. Apparatus and method for providing a wireless link between two local area network systems. 4,876,742, Cl. 455-66.000.

Vahlensieck, Hans-Joachim: *See—*
Rauleder, Hartwig; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,876,337, Cl. 556-415.000.

Valentine, Kenneth H.: *See—*
Kerr, Howard T.; Buchanan, Michael E.; and Valentine, Kenneth H., 4,876,721, Cl. 358-56.000.

Valenzuela, Pablo D. T.: *See—*
Burke, Rae Lyn; Rosenberg, Steven; Shuster, Jeffrey R.; Tekamp-Olson, Patricia A.; and Valenzuela, Pablo D. T., 4,876,197, Cl. 435-172.300.

VALEO: *See—*
Bouvot, Jean F., 4,875,388, Cl. 74-579.00R.

Vallery, Stafford J.: *See—*
Schlesch, Ronald D.; Armstrong, Merrill H.; Vallery, Stafford J.; and Durham, Harold S., 4,875,428, Cl. 114-255.000.

Van Der Woude Plastic Corporation: *See—*
Van der Woude, Gerbrig W., 4,875,829, Cl. 416-2.000.

Van Asten, Scot R.: *See—*
Parmely, Kevin W.; Van Asten, Scot R.; and Stanton, Harbor E., 4,876,674, Cl. 367-139.000.

van Bavel, Nicholas; and Williams, Tim A., to Motorola, Inc. Multiple output oversampling A/D converter with each output containing data and noise. 4,876,542, Cl. 341-143.000.

van Bavel, Nicholas R., to Motorola, Inc. Multi-rate cascaded noise shaping modulator. 4,876,543, Cl. 34.1-143.000.

Vande Kieft, Lawrence J.: *See—*
Mishra, Indu B.; and Vande Kieft, Lawrence J., 4,875,949, Cl. 149-19.300.

Vandenberg, Donald E.; Jacques, Donald A.; and Schaffer, William E., to Eastman Kodak Company. Method for correction of distortions of a mirror. 4,875,765, Cl. 350-611.000.

Vandenberg, Donald E.: *See—*
Marino, Philip F.; and Vandenberg, Donald E., 4,875,764, Cl. 350-611.000.

Vanderhider, James A.: *See—*
Meyer, Louis W.; Vanderhider, James A.; and Carswell, Robert, 4,876,019, Cl. 252-32.500.

Van der Woude, Gerbrig W., to Van Der Woude Plastic Corporation. Marine propeller. 4,875,829, Cl. 416-2.000.

Vande Ven, Susan: *See—*
Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., 4,876,291, Cl. 521-124.000.

Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, to Lummus Crest, Inc. Solid addition and withdrawal. 4,875,995, Cl. 208-152.000.

Van Elderen, Daniel N.; and Lichac, Gerald J., to 501 Atari Games. Gattling-like gun. 4,875,459, Cl. 124-49.000.

van Gooswilligen, Gerrit: *See—*
Vonk, Willem C.; and van Gooswilligen, Gerrit, 4,876,130, Cl. 428-40.000.

Vanier, Noel R.; and Lum, Kin K., to Eastman Kodak Company. Material for increasing dye transfer efficiency in dye-donor elements used in thermal dye transfer. 4,876,236, Cl. 503-227.000.

Vanier, Noel R.; and Lum, Kin K., to Eastman Kodak Company. Increasing dye transfer efficient in dye-donor elements used in thermal dye transfer. 4,876,238, Cl. 503-227.000.

Van Kleeck, David A., to Shell Oil Company. Removal of H_2S from gas streams. 4,876,075, Cl. 423-226.000.

van Moorsel, Josephus J.: *See—*
De Deugd, Johannes A. G.; and van Moorsel, Josephus J., 4,876,477, Cl. 313-404.000.

Van Nest, Gary A.: *See—*
Luciw, Paul; Parkes, Deborah L.; and Van Nest, Gary A., 4,876,089, Cl. 424-89.000.

Van Sickle, Dale E., to Eastman Kodak Company. Recovery of dialkyl naphthalene-2,6-dicarboxylates from naphthalene-2,6-dicarboxylic acid-containing polyesters. 4,876,378, Cl. 560-78.000.

Van Vaals, Johannes J., to U.S. Philips Ltd. Method of and device for automatic phase correction of complex NMR spectra. 4,876,507, Cl. 324-307.000.

Van Valkenburg, N. L. Storage enclosure. 4,875,595, Cl. 220-1.500.

VanVleet, Stephen B.: *See—*
Rivera, Raymond R.; VanVleet, Stephen B.; and Wilson, Shari J., 4,876,123, Cl. 428-34.200.

van Wersch, Kurt; Freiberg, Helge; and Mevissen, Peter, to A. Monforts GmbH & Co. Method of cleaning residual dye material from rollers of a textile fabric drying oven. 4,875,942, Cl. 134-15.000.

Varco International, Inc.: *See—*
Wetch, Stephen B.; Goris, Gregory A.; and Krasnov, Igor, 4,875,529, Cl. 173-163.000.
Varian Associates, Inc.: *See—*
Feinstein, Joseph, 4,876,687, Cl. 372-2.000.
Seppi, Edward J., 4,875,487, Cl. 128-660.030.
Varrio, Jukka: *See—*
Pessa, Markus; Asonen, Harry; Varrio, Jukka; and Salokatve, Arto, 4,876,218, Cl. 437-107.000.
Varshavsky, Vladimir D.: *See—*
Khutoretsky, Garri M.; Tjurin, Jury G.; Varshavsky, Vladimir D.; Zagorodnaya, Galina A.; and Fridman, Vladimir M., 4,876,469, Cl. 310-52.000.
VDM Nickel-Technologie Aktiengesellschaft: *See—*
Rockel, Manfred; Wallis, Ernst; Kohler, Michael; Heubner, Ulrich; and Kirchheiner, Rolf, 4,876,065, Cl. 420-582.000.
Vecchia, Gino D., to Sperotto Rimar S.p.A. Apparatus for the presettable calendering of tubular knitted fabric. 4,875,260, Cl. 26-81.000.
Veldhuis, Raymond N. J., to U.S. Philips Corporation. Device for reproducing digitized video pictures using an improved restoration method. 4,876,595, Cl. 358-136.000.
Velie Circuits, Inc.: *See—*
Velie, Larry N., 4,875,982, Cl. 204-14.000.
Velie, Larry N., to Velie Circuits, Inc. Plating high aspect ratio holes in circuit boards. 4,875,982, Cl. 204-14.000.
Velsko, Stephan P.: *See—*
Wang, Francis; and Velsko, Stephan P., 4,876,688, Cl. 372-22.000.
Verbanets, William R.; and Elms, Robert T., to Westinghouse Electric Corp. Wide dynamic range current measuring apparatus. 4,876,502, Cl. 324-115.000.
Verhoeff, Abraham, to Shell Canada Limited; and Shell Explorer Limited. Topological separator. 4,876,004, Cl. 210-170.000.
Verhoeven, Thomas R.: *See—*
Schuda, Ann D.; Verhoeven, Thomas R.; and Shinkai, Ichiro, 4,876,364, Cl. 549-214.000.
Verkuylen, Adrianus H. I., to Peters, Willem. Front wheel suspension for motorcycles. 4,875,543, Cl. 180-219.000.
Vermilyea, Mark E., to General Electric Company. Efficient thermal joints for connecting current leads to a cryocooler. 4,876,413, Cl. 174-15.400.
Vermot-Gaud, Jacque; Cottenceau, Remi; and Zuercher, Erwin, to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH. Method of actuation of needle selection latches of a knitting machine, and a device for performing the method. 4,875,347, Cl. 66-219.000.
Verneker, Vencatesh R. P. Combustible delay barriers. 4,875,948, Cl. 149-15.000.
Veronesi, Luciano: *See—*
Ekeroth, Douglas E.; and Veronesi, Luciano, 4,876,061, Cl. 376-353.000.
Vetter, Heinz: *See—*
Hennig, Jurgen; Vetter, Heinz; and Munzer, Manfred, 4,876,311, Cl. 525-229.000.
Victoor, Johnny: *See—*
Moeneclaey, Denis; Coopman, Lucien; and Victoor, Johnny, 4,875,505, Cl. 139-448.000.
Vifian, Hugo: *See—*
Wong, Roger W.; Vifian, Hugo; and Hart, Michael G., 4,875,859, Cl. 434-214.000.
Viles, Robert F., to Fosroc International Limited. Cementitious composition. 4,875,937, Cl. 106-104.000.
Vinchon, Andre : *See—*
Cagnon, Francois; Di Paola, Denis; Austruy, Georges; and Vinchon, Andre , 4,875,850, Cl. 431-8.000.
Virkar, Anil V., to Ceramatec, Inc. Ceramic bodies having a plurality of stress zones. 4,876,148, Cl. 428-384.000.
Vivant, Gilbert, to Rhone-Poulenc Chimie. Microencapsulation by interfacial polyaddition. 4,876,290, Cl. 521-76.000.
Vivenzio, Robert L.: *See—*
Krauter, Allan I.; and Vivenzio, Robert L., 4,875,468, Cl. 128-3.000.
Voest-Alpine Maschinenbau Gesellschaft m.b.H.: *See—*
Zitz, Alfred; and Brandl, Erich, 4,875,738, Cl. 299-80.000.
Vogelbusch Gesellschaft m.b.H.: *See—*
Salzbrunn, Wolfgang; Steiner, Eva; Wohrer, Wilfried; and Meixner, Otto, 4,876,196, Cl. 435-161.000.
Vogt, Ernst: *See—*
Kloucek, Franz; Larsson, Per-Olof; and Vogt, Ernst, 4,875,613, Cl. 228-44.300.
Voight, Richard W.: *See—*
Logsdon, John E.; Loke, Richard A.; Merriam, Jay S.; and Voight, Richard W., 4,876,402, Cl. 568-881.000.
Volkswagen AG: *See—*
Kramer, Karl-Martin; and Dorenkamp, Richard, 4,875,449, Cl. 123-400.000.
Vollinger, Hubert: *See—*
Pietzsch, Ludwig; Senger, Detlef; Winter, Horst; and Vollinger, Hubert, 4,876,600, Cl. 358-183.000.
Vollmann, William; and Mumford, Van E., to Telectronics, N.V. Implantable cardiac pacer with programmable antitachycardia mechanisms. 4,875,483, Cl. 128-419.0PG.
Voltronics Corporation: *See—*
Mittler, Martin A.; and Scowen, Kenneth J., 4,876,627, Cl. 361-293.000.
von der Haar-Czogalla, Rita: *See—*
Czogalla, Claus-D., 4,876,361, Cl. 549-41.000.
Vonk, Willem C.; and van Gooswilligen, Gerrit, to Shell Oil Company. Bituminous composition and use thereof as cold-applicable self-adhesive compound. 4,876,130, Cl. 428-40.000.
Von Kohorn, Henry, to Von Kohorn, Henry. System for mechandising and the evaluation of responses to broadcast transmissions. 4,876,592, Cl. 358-84.000.
von Laar, Klaus: *See—*
Stadler, Hansjorg; and von Laar, Klaus, 4,875,414, Cl. 102-307.000.
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., to Sierracin Corporation. Electroconductive film system for aircraft windows. 4,876,178, Cl. 430-314.000.
Vriesema, Bindert K.; and Miniaci, Francesco, to Stamicarbon B.V. Aromatic polyester. 4,876,327, Cl. 528-173.000.
Vsesojuzny Nauchno-Issledovatelsky I Ispytatelny Institut Meditsinskoi Tekhniki: *See—*
Belykh, Sergei I.; Davydov, Anatoly B.; Moschensky, Anatoly D.; Kanshin, Nikolai N.; Kovalenko, Igor L.; Kirillov, Jury B.; Osipov, Gennady I.; and Utyamyshev, Rustam I., 4,875,479, Cl. 128-335.500.
W. A. Lane, Inc.: *See—*
Lane, William A., Sr., 4,875,620, Cl. 229-1.50B.
W. H. Brady Co.: *See—*
Gratke, Norman G., 4,876,461, Cl. 307-116.000.
W. L. Gore & Associates, Inc.: *See—*
Campbell, Michael L.; Williams, Benjamin G.; Riffle, Rob G.; and Biggerstaff, Charles E., 4,876,051, Cl. 264-127.000.
W. R. Grace & Co.-Conn.: *See—*
Lulham, Cedric M.; Wofford, George D.; Bradfute, John G.; and Friedrich, Steven G., 4,875,587, Cl. 206-484.000.
Smith, Edward M.; and Cornelison, Richard C., 4,875,436, Cl. 122-7.00R.
WABCO Westinghouse Fahrzeugbremsen GmbH: *See—*
Heger, Werner; Kramer, Manfred; and Schlossarczyk, Heinrich, 4,875,503, Cl. 137-856.000.
WABCO Westinghouse Steuerungstechnik GmbH: *See—*
Bernhardt, Bruno; and Kedzierski, Heinrich, 4,875,405, Cl. 92-194.000.
Wada, Fukuaki: *See—*
Maeda, Tetsuro; Wada, Fukuaki; Ohoka, Susumu; and Okamoto, Akihiro, 4,876,145, Cl. 428-327.000.
Wada, Fusazo: *See—*
Yamamoto, Takeshi; Kondo, Kunio; Yoshimura, Hiroshi; Wada, Yoshihiro; and Wada, Fusazo, 4,876,139, Cl. 428-200.000.
Wada, Toshiaki; Katsuyama, Yoshiaki; and Nakaoka, Junichi, to Sumitomo Special Metals, Co., Ltd. Grooved magnetic substrates and method for producing the same. 4,875,987, Cl. 204-192.150.
Wada, Yoshihiro: *See—*
Yamamoto, Takeshi; Kondo, Kunio; Yoshimura, Hiroshi; Wada, Yoshihiro; and Wada, Fusazo, 4,876,139, Cl. 428-200.000.
Waddell, James A.: *See—*
Lents, Rollie T., 4,875,622, Cl. 232-39.000.
Waespe, Hans-Rudolf, to Ciba-Geigy Corporation. Pesticidal diphenylethylene derivatives. 4,876,270, Cl. 514-439.000.
Wagner, Edward A.; and Guiver, Harold C., to Berkeley Quartz Lab, Inc. Cantilevered diffusion chamber atmospheric loading system and method. 4,876,225, Cl. 437-248.000.
Waitl, Guenther: *See—*
Spaeth, Werner; Waitl, Guenther; Kuhlmann, Werner; Althaus, Hans-Ludwig; Birkmann, Rolf; Klos, Waltraud; and Schubert, Axel, 4,875,750, Cl. 350-96.180.
Wake, Ronald W.; Reithel, Sibylle L.; and McGuckin, Hugh G., to Eastman Kodak Company. Color filter array. 4,876,166, Cl. 430-7.000.
Wakefield, Peter D., to Delfield Precision Engineering Limited. Golf club measuring device. 4,875,293, Cl. 33-508.000.
Wakley, William D.: *See—*
Young, Grant A.; Wakley, William D.; and Andrews, Steven L., 4,876,016, Cl. 210-739.000.
Wakunaga Seiyaku Kabushiki Kaisha: *See—*
Yamane, Akio; Kawasoe, Tatsuro; Tsukumo, Noriko; and Miyoshi, Kenichi, 4,876,335, Cl. 536-27.000.
Yoshida, Susumu; Nakagawa, Shizutoshi; Ushiroguchi, Tsuyoshi; Matsuura, Hiromichi; and Yazaki, Akira, 4,876,281, Cl. 514-517.000.
Waldenrath, Werner: *See—*
Dziurla, Heinz-Jurgen; Freitag, Dieter; Waldenrath, Werner; Burkhardt, Claus; and Schulte, Bernhard, 4,876,033, Cl. 252-511.000.
Waldock, Kevin H.; and Wasson, Daniel A., to CBS Explosives Pty Limited. Explosive composition. 4,875,950, Cl. 149-21.000.
Waldorf Corporation: *See—*
Mode, Duane R., 4,876,427, Cl. 219-10.55E.
Walgren, Susan M.: *See—*
Mayer, David W.; Gilman, Byron L.; Walgren, Susan M.; and Berglund, June M., 4,876,109, Cl. 427-2.000.
Walker, John C.; and Holmes, Thomas, to SP Tyres UK Limited. Method of detecting a deflated tire on a vehicle. 4,876,528, Cl. 340-442.000.
Walker, William G.: *See—*
Griffiths, Colin; and Walker, William G., 4,875,954, Cl. 156-64.000.
Wallbillich, Guenter, to BASF Aktiengesellschaft. Negative correction of gravure printing plates. 4,876,118, Cl. 427-142.000.
Waller, George W. Drying rack and receptacle for towels and wash cloths. 4,875,592, Cl. 211-88.000.
Wallington, Kenneth: *See—*
Hardy, Judy; and Wallington, Kenneth, 4,875,870, Cl. 439-204.000.

Wallis, Ernst: *See*—
Rockel, Manfred; Wallis, Ernst; Kohler, Michael; Heubner, Ulrich; and Kirchheiner, Rolf, 4,876,065, Cl. 420-582.000.
Wan, Chi-Meen, to Famcy Steel Corporation. Melting method for producing low chromium corrosion resistant and high damping capacity Fe-Mn-Al-C based alloys. 4,875,933, Cl. 75-10.170.
Wang, Francis; and Velsko, Stephan P., to United States of America, Energy. Frequency doubling crystals. 4,876,688, Cl. 372-22.000.
Wang, Patrick S.-C.; and Baines, Roger F., to Johnson Electric Industrial Manufactory, Limited. Commutator. 4,876,474, Cl. 310-236.000.
Ward, John W.: *See*—
Ratcliffe, Charles T.; and Ward, John W., 4,876,408, Cl. 585-467.000.
Wardlaw, Stephen C.: *See*—
Levine, Robert A.; and Wardlaw, Stephen C., 4,875,364, Cl. 73-61.10R.
Warner-Lambert Company: *See*—
Hodges, John C.; and Klutchko, Sylvester, 4,876,343, Cl. 544-168.000.
Jan, Chaur-Ming; and Oehling, Mark E., 4,875,435, Cl. 118-62.000.
Piano, Anthony P., 4,875,326, Cl. 53-435.000.
Yang, Robert K., 4,876,095, Cl. 426-3.000.
Waschke, Christine; Topfer, Lothar; and Rath, Alfred, to Dragerwerk Aktiengesellschaft. Protective mask having a built-in sensor for monitoring vital functions. 4,875,477, Cl. 128-206.210.
Washbourn, Jack: *See*—
Langley, Keith W.; and Washbourn, Jack, 4,875,559, Cl. 188-203.000.
Washington, James O. Stove top adapter. 4,875,463, Cl. 126-80.000.
Wasson, Daniel A.: *See*—
Waldock, Kevin H.; and Wasson, Daniel A., 4,875,950, Cl. 149-21.000.
Watakabe, Yaichiro; Okamoto, Tatsuo; and Matsuda, Shuichi, to Mitsubishi Denki Kabushiki Kaisha. Process for manufacturing a photomask. 4,876,164, Cl. 430-5.000.
Watanabe, Ikuo, to Usui Kokusai Sangyo Kaisha Ltd. Slender tube connector. 4,875,711, Cl. 285-45.000.
Watanabe, Junichiro: *See*—
Funahashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Matsumoto, Makaoto, 4,876,363, Cl. 549-215.000.
Watanabe, Kouichi: *See*—
Endo, Masanori; and Watanabe, Kouichi, 4,876,631, Cl. 361-502.000.
Watanabe, Masataka; Ohhara, Nobuhiro; and Taguchi, Kenichi, to Shin-Etu Handotai Co., Ltd. Control of the power to the heater and the speed of movement of a crystal rod by control of the crystal rod diameter. 4,876,438, Cl. 219-497.000.
Watanabe, Nobuyuki: *See*—
Honma, Toshio; and Watanabe, Nobuyuki, 4,876,612, Cl. 358-474.000.
Watanabe, Takuya: *See*—
Eshita, Takashi; Mieno, Fumitake; Furumura, Yuji; and Watanabe, Takuya, 4,876,219, Cl. 437-126.000.
Watanabe, Tamotsu: *See*—
Onuki, Toru; Sagawa, Junichi; Watanabe, Tamotsu; and Yoshimitsu, Toshio, 4,876,158, Cl. 428-565.000.
Watanabe, Tohru: *See*—
Yoda, Takashi; and Watanabe, Tohru, 4,876,223, Cl. 437-228.000.
Watanabe, Toyofumi: *See*—
Iwasa, Hiroki; Watanabe, Toyofumi; and Furuya, Hirohide, 4,875,984, Cl. 204-56.100.
Watanabe, Yuji; and Nakamura, Masahiro, to Kabushiki Kaisha Komatsu Seisakusho. Method of identifying objects. 4,876,729, Cl. 382-22.000.
Watanuki, Osaaki: *See*—
Kaneko, Toyohisa; and Watanuki, Osaaki, 4,876,720, Cl. 381-43.000.
Water Systems Development Corporation: *See*—
Malson, William S., 4,876,014, Cl. 210-668.000.
Waton, Gilles: *See*—
Candau, Sauveur; Leroy, Maurice; Brunette, Jean-Pierre; Mallo, Paul; Loret, Jean-Francois; and Waton, Gilles, 4,876,036, Cl. 252-637.000.
Wavetek Microwave, Inc.: *See*—
Herscher, Bret A., 4,876,654, Cl. 364-483.000.
Way Construction, Inc.: *See*—
Hicks, Gary D., 4,875,800, Cl. 404-35.000.
Webb, Colin F.: *See*—
Butina, Darko; Dowle, Michael D.; Bays, David E.; and Webb, Colin F., 4,876,267, Cl. 514-415.000.
Weber, Guenter: *See*—
Kliem, Erhard; Weber, Guenter; and Kunz, Alfred, 4,876,079, Cl. 423-578.00R.
Wedel, Gregory L., to Beloit Corporation. Transfer apparatus from press section to drying section. 4,875,976, Cl. 162-306.000.
Weder, Donald E.; and Chi, Tsu T., to Seven W. Enterprises, Inc. Detection of antibodies against a chorionic gonadotropin-like substance. 4,876,192, Cl. 435-21.000.
Wefler, Mark E.: *See*—
Buhler, James E.; Crapser, James R.; Miller, Allen D.; and Wefler, Mark E., 4,875,626, Cl. 239-314.000.
Weiner, Hans: *See*—
Gietzen, Staas; Weiner, Hans; Hain, Klaus; Hofbauer, August; and Hawener, Juergen, 4,875,643, Cl. 244-53.00A.
Weinstein, Jack, to Primary Delivery Systems, Inc. Metered dispensing cap for tubes. 4,875,603, Cl. 222-205.000.
Weirton Steel Corporation: *See*—
Saunders, William T., 4,875,597, Cl. 220-458.000.
Weisend, Norbert A., Jr.: *See*—
Adams, Lowell J.; Simshauser, Steven C.; Pisarski, Nathan; and Weisend, Norbert A., Jr., 4,875,644, Cl. 244-134.00R.
Weisler, Richard. Systemic insect repellent composition and method. 4,876,090, Cl. 424-195.100.
Weiss, Ekkehard: *See*—
Klaus, Michael; and Weiss, Ekkehard, 4,876,349, Cl. 546-350.000.
Weiss, Elmar: *See*—
Shaw, Steven; and Weiss, Elmar, 4,875,556, Cl. 188-72.400.
Weiss, Johannes S.: *See*—
Graves, Alan F.; Littlewood, Paul A.; and Weiss, Johannes S., 4,876,682, Cl. 370-66.000.
Weiss, Lee E.: *See*—
Sanderson, Arthur C.; Weiss, Lee E.; and Nayar, Shree K., 4,876,455, Cl. 250-560.000.
Welch Allyn, Inc.: *See*—
Krauter, Allan I.; and Vivenzio, Robert L., 4,875,468, Cl. 128-3.000.
Welch, Glenn S.; Fidrych, Stephen; Romm, Michael; and Maurer, Bernie J., to Digital Equipment Corporation. Modular faceplate system. 4,875,880, Cl. 439-536.000.
Welch, Robert J.; Kolvites, Albert; and White, Robert M., to Inter-Metro Industries Corporation. Caster direction-locking mechanism for mobile cart. 4,875,696, Cl. 280-47.340.
Wella Aktiengesellschaft: *See*—
Hilderbrandt, Bodo; and Steigerwald, Franz, 4,875,577, Cl. 206-219.000.
Weller, Raymond N. Intermodal caged flatbed for efficient containerized cargo handling. 4,875,814, Cl. 410-66.000.
Wellman, Edward F.; and Michaels, Francis J. Golf club swing improvement apparatus. 4,875,683, Cl. 273-187.00B.
Wen, Liang-Chi: *See*—
Jones, Jack A.; Wen, Liang-Chi; and Bard, Steven, 4,875,346, Cl. 62-467.000.
Wenger, LaVon G.; Hauck, Bobbie W.; and Hartter, Timothy R., to Wenger Manufacturing, Inc. Twin-screw extruder having respective conical nose screw sections. 4,875,847, Cl. 425-204.000.
Wenger Manufacturing, Inc.: *See*—
Wenger, LaVon G.; Hauck, Bobbie W.; and Hartter, Timothy R., 4,875,847, Cl. 425-204.000.
Wergin, Antone L.: *See*—
Wergin, Dennis D.; and Wergin, Antone L., 4,875,651, Cl. 248-286.000.
Wergin, Dennis D.; and Wergin, Antone L. Transducer mounting device. 4,875,651, Cl. 248-286.000.
Wersing, Wolfram: *See*—
Bast, Ulrich; and Wersing, Wolfram, 4,876,179, Cl. 430-320.000.
Westerfield, Edwin E.: *See*—
Devereux, William S.; and Westerfield, Edwin E., 4,876,659, Cl. 364-717.000.
Westinghouse Brake & Signal Holdings Ltd.: *See*—
Langley, Keith W.; and Washbourn, Jack, 4,875,559, Cl. 188-203.000.
Westinghouse Electric Corp.: *See*—
Bauer, Frank I.; Mavretish, Robert S.; Shogan, Regis P.; and Sejvar, James, 4,876,593, Cl. 358-100.000.
Brown, Stephen D.; Junker, Warren R.; and Gradich, Francis X., 4,876,506, Cl. 324-220.000.
Chow, Kung C., 4,876,624, Cl. 361-87.000.
Ekeroth, Douglas E.; and Veronesi, Luciano, 4,876,061, Cl. 376-353.000.
Fero, Arnold H.; Potochnik, Lawrence M.; Riling, Ronald W.; and Semethy, Kenneth F., 4,876,058, Cl. 376-247.000.
Kosi, Ceasar U., 4,875,691, Cl. 277-147.000.
Osborne, Robert L., 4,876,505, Cl. 324-208.000.
Paice, Derek A., 4,876,634, Cl. 363-5.000.
Reichner, Philip, 4,876,163, Cl. 429-30.000.
Sanderson, Arthur C.; Weiss, Lee E.; and Nayar, Shree K., 4,876,455, Cl. 250-560.000.
Schara, Kristen T.; Kulik, David B.; and McIlvaine, Scott E., 4,875,461, Cl. 125-23.00R.
Verbanets, William R.; and Elms, Robert T., 4,876,502, Cl. 324-115.000.
Wolfe, William R., 4,876,625, Cl. 361-93.000.
Westinhouse Electric Corp.: *See*—
Twerdochlib, Michael, 4,875,373, Cl. 73-655.000.
Westland Group plc: *See*—
Breakspear, Colin J., 4,875,962, Cl. 156-245.000.
Weston, Terence E., to Microvol Limited. Pressurized metering dispenser. 4,875,605, Cl. 222-402.240.
Wetch, Stephen B.; Goris, Gregory A.; and Krasnov, Igor, to Varco International, Inc. Alternate forms of, side drive drilling. 4,875,529, Cl. 173-163.000.
Wettstein, Ulrich. Parts organizer. 4,875,744, Cl. 312-266.000.
Weyand, Manfred: *See*—
Hafele, Carl H.; and Weyand, Manfred, 4,875,659, Cl. 251-282.000.
Whaley, Mark A. Convertible game carrying case. 4,875,688, Cl. 273-285.000.
Wheaton, Gregory A.: *See*—
Gardner, David M.; Wheaton, Gregory A.; and Nosowitz, Martin, 4,876,048, Cl. 260-543.00R.
Wheless, Jack C., to Philip Morris Incorporated. Separation of light particles from heavy particles in a stream of particulate matter. 4,875,495, Cl. 131-110.000.

White, C. Douglas: *See*—
Head, James D.; Burns, Edward F.; Schleizer, William A.; White, C. Douglas; and Gentry, Dennis L., 4,875,662, Cl. 266-44.000.
White, Hollis N., Jr. Staggered rotor gerotor device. 4,875,841, Cl. 418-60.000.
White, Robert M.: *See*—
Welch, Robert J.; Kolvites, Albert; and White, Robert M., 4,875,696, Cl. 280-47.340.
White, Victor: *See*—
Kopp, Clinton V.; Roberts, Dennis; Biltoft, Bruce G.; and White, Victor, 4,876,012, Cl. 210-644.000.
Whitfield, Arthur A., to Eastman Kodak Company. Three-part decoder circuit. 4,876,697, Cl. 375-22.000.
Wickens, Donald C.: *See*—
Logan, John R.; and Wickens, Donald C., 4,875,317, Cl. 52-208.000.
Widmer, Steven L.; Neisen, Gerald F.; Ruhnke, Jeffrey P.; Steffes, Thomas J.; and Buchholz, Brian S., to Brunswick Corporation. Marine propulsion system with fuel line cooler. 4,875,439, Cl. 123-541.000.
Wiencek, Donald C.: *See*—
Caveny, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wiencek, Donald C., 4,875,881, Cl. 439-535.000.
Wigglesworth, Paul; and Ellis, Roger D., to Colgate-Palmolive Company. Apparatus for making a post-foaming gel. 4,876,038, Cl. 261-152.000.
Wilbut, Daniel S.; and Hadley, Stephen W., to NeoRx Corporation. Vinyl substituted radiohalogen and methods of use conjugates. 4,876,081, Cl. 424-1.100.
Wilde, Daniel R., to Applied Material Handling, Inc. Container filling apparatus and method. 4,875,327, Cl. 53-475.000.
Wileman, Ben C., III, to Wileman Industries, Inc. Toilet apparatus with automatic self-cleaning means. 4,875,243, Cl. 4-662.000.
Wileman Industries, Inc.: *See*—
Wileman, Ben C., III, 4,875,243, Cl. 4-662.000.
Wilkinson, Kevin. Wheel lock system apparatus. 4,875,819, Cl. 411-432.000.
Willard, Miles J. Snack food ingredient and method for making same. 4,876,101, Cl. 426-549.000.
Willard, Reginald A.: *See*—
Best, Stuart J.; and Willard, Reginald A., 4,876,617, Cl. 360-60.000.
Willford, George A.: *See*—
Holman, James L.; and Willford, George A., 4,875,383, Cl. 74-473.00R.
Williams, Benjamin G.: *See*—
Campbell, Michael L.; Williams, Benjamin G.; Riffle, Rob G.; and Biggerstaff, Charles E., 4,876,051, Cl. 264-127.000.
Williams, Christopher, to Williams & White Machine Shop. Apparatus for tensioning and deforming saw blades. 4,875,393, Cl. 76-27.000.
Williams, Clark R.: *See*—
Podkowa, William J.; and Williams, Clark R., 4,876,465, Cl. 307-443.000.
Williams, Jon I.: *See*—
Khanna, Yash P.; Bhattacharjee, Himangshu R.; Kumar, Rakesh; Williams, Jon I.; and Sibilia, John P., 4,876,127, Cl. 428-35.700.
Williams, Rodney K.; Bohnen, Bruce A.; and Heikkila, Kurt E., to Du Pont de Nemours, E. I., and Company. Hydrogen peroxide compositions containing a substituted oxybenzene compound. 4,875,972, Cl. 156-664.000.
Williams, Rodney K.: *See*—
Heikkila, Kurt E.; Williams, Rodney K.; and Bohnen, Bruce A., 4,875,973, Cl. 156-664.000.
Williams, Tim A.: *See*—
van Bavel, Nicholas; and Williams, Tim A., 4,876,542, Cl. 341-143.000.
Wiliams & White Machine Shop: *See*—
Williams, Christopher, 4,875,393, Cl. 76-27.000.
Willkop, Franz; Zahring, Gerhard; Rutsch, Robert; Popp, Joachim; and Eberhard, John, to MTU Motoren-und Turbinen-Union Munchen GmbH. Turbo-engine having means for controlling the radial gap. 4,875,828, Cl. 415-173.400.
Wilson, John E.: *See*—
Turner, Reed J.; Peters, Loren W.; Wilson, John E.; and Bennett, Robert E., 4,875,891, Cl. 460-110.000.
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., to International Flavors & Fragrances Inc.; and University of Florida, The. Use of N,N-diethyl-m-toluamide and/or the ethyl ester of 2-methyl-3-pentenoic acid as mosquito attractants. 4,876,087, Cl. 424-84.000.
Wilson, Shari J.: *See*—
Rivera, Raymond R.; VanVleet, Stephen B.; and Wilson, Shari J., 4,876,123, Cl. 428-34.200.
Winant, Arnold F. Light bulb socket. 4,875,866, Cl. 439-140.000.
Windsor, John F., Jr. Electrical connector securing arrangement. 4,875,874, Cl. 439-364.000.
Wingate-Hill, Robin; and Hadaway, Bernard M., to Commonwealth Scientific and Industrial Research Organisation. Apparatus for removing bark from logs. 4,875,511, Cl. 144-208.00R.
Wingen, Rainer: *See*—
Hemmerling, Wolfgang; Dubal, Hans-Rolf; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,876,028, Cl. 252-299.610.
Winter, Horst: *See*—
Pietzsch, Ludwig; Senger, Detlef; Winter, Horst; and Vollinger, Hubert, 4,876,600, Cl. 358-183.000.
Winzen, Wilfried; and Wunschmann, Manfred, to Witzenmann GmbH Metallschlauch-Fabrik Pforzheim. Jointed pipe connection, particularly for automotive exhaust pipes. 4,875,716, Cl. 285-137.100.
Wireman, Wallace. Gas & odor adsorbing unit. 4,875,914, Cl. 55-389.000.
Wirick, Michael P., to Hughes Aircraft Company. Method and apparatus for calibrating an imaging sensor. 4,876,453, Cl. 250-332.000.
Wirth, Hermann O.: *See*—
Gusten, Hans; Ache, Hans-Joachim; Rinke, Monika; and Wirth, Hermann O., 4,876,029, Cl. 252-301.170.
Wiseman, John A., to Simplimatic Engineering Company. Wheel turn and hanger bracket assembly therefor. 4,875,573, Cl. 198-831.000.
Withycombe, Donald: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,876,087, Cl. 424-84.000.
Witronic Elektronische Gerate Gesellschaft M.B.H.: *See*—
Spitzer, Martin, 4,875,370, Cl. 73-309.000.
Witters, Hugo F. J.; and Wouters, Joannes C. A. M., to Alcatel N.V. Digital data transmission system having additional bits for auxiliary data. 4,876,695, Cl. 375-3.000.
Witting, Lothar: *See*—
Peetz, Dieter; Scheeren, Peter; Siemonsen, Hans-Peter; Reinicke, Ralf; Witting, Lothar; and Schafhausen, Aloisius, 4,875,308, Cl. 49-501.000.
Witucki, Gerald L.; and Plueddemann, Edwin P., to Dow Corning Corporation. Composite wood structures bonded by poly(vinyl acetate) emulsion adhesives containing an alkoxysilane. 4,876,154, Cl. 428-447.000.
Witzenmann GmbH Metallschlauch-Fabrik Pforzheim: *See*—
Winzen, Wilfried; and Wunschmann, Manfred, 4,875,716, Cl. 285-137.100.
Witztum, Joseph: *See*—
Smith, Richard; Lamb, Peta-Maree; Curtiss, Linda K.; and Witztum, Joseph, 4,876,188, Cl. 435-7.000.
Wofford, George D.: *See*—
Lulham, Cedric M.; Wofford, George D.; Bradfute, John G.; and Friedrich, Steven G., 4,875,587, Cl. 206-484.000.
Wohrer, Wilfried: *See*—
Salzbrunn, Wolfgang; Steiner, Eva; Wohrer, Wilfried; and Meixner, Otto, 4,876,196, Cl. 435-161.000.
Wojciehowski, Stephen J.: *See*—
Copp, David F.; and Wojciehowski, Stephen J., 4,875,728, Cl. 293-126.000.
Wolf, Carol L.; LaVelle, William M.; and Clark, Ross C., to Merck & Co., Inc. Gellan gum/gelatin blends. 4,876,105, Cl. 426-573.000.
Wolf-Gerate GmbH: *See*—
Kolb, Walter, 4,876,490, Cl. 318-17.000.
Wolfe, William R., to Westinghouse Electric Corp. Composite circuit breaker system. 4,876,625, Cl. 361-93.000.
Wong, David T.: *See*—
Robertson, David W.; and Wong, David T., 4,876,282, Cl. 514-554.000.
Wong, Kwok-Keung: *See*—
Goldner, Ronald B.; Haas, Terry; Wong, Kwok-Keung; and Seward, George, 4,876,628, Cl. 361-313.000.
Wong, Patrick S. L.: *See*—
Theeuwes, Felix; and Wong, Patrick S. L., 4,876,093, Cl. 424-438.000.
Wong, Roger W.; Vifian, Hugo; and Hart, Michael G., to Hewlett-Packard Company. Method and apparatus for guiding a user during setup of a signal measurement system. 4,875,859, Cl. 434-214.000.
Wong, Yee-Shing: *See*—
Hou, Donald; Wong, Yee-Shing; Gala, Dinesh; and Steinman, Martin, 4,876,338, Cl. 540-357.000.
Woodworth, Donald J.; Ziegler, Frank A.; and Grabenstein, James B., to Microdyne Corporation. Satellite data transmission and receiving station. 4,876,737, Cl. 455-12.000.
Wooldridge, Timothy A.: *See*—
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Abernathy, Joe V.; and Wooldridge, Timothy A., 4,875,989, Cl. 204-298.000.
Worthington, Ralph T. Capacitance liquid level sensing and touch control system. 4,875,497, Cl. 137-2.000.
Woskow, Robert. Light switch and outlet guard. 4,876,425, Cl. 200-43.160.
Wouters, Joannes C. A. M.: *See*—
Witters, Hugo F. J.; and Wouters, Joannes C. A. M., 4,876,695, Cl. 375-3.000.
Wright, Kenneth W. Apparatus and methods for marking the visual center of the cornea of a human eye. 4,875,767, Cl. 351-212.000.
Wright, Norman D.; Glanzner, Gary C.; and Signorelli, John A. Printing press blanket cleaner. 4,875,412, Cl. 101-425.000.
Wright, Robert L. Preheater for clothes dryer. 4,875,298, Cl. 34-86.000.
Wright, Tim: *See*—
Helton, Catherine; and Wright, Tim, 4,875,419, Cl. 108-56.100.
Wu, Chuan-Chueng. User carried sensor for detecting displacement relative to the ground. 4,876,500, Cl. 324-61.00R.
Wu, Han-Chin; and Xu, Zhiyou, to University of Iowa Research Foundation. Axial-torsional extensometer. 4,875,375, Cl. 73-795.000.
Wu, Margaret M.: *See*—
Lo, Frederick Y.; Nowlin, Thomas E.; and Wu, Margaret M., 4,876,321, Cl. 526-129.000.
Wunschmann, Manfred: *See*—
Winzen, Wilfried; and Wunschmann, Manfred, 4,875,716, Cl. 285-137.100.
Xerox Corporation: *See*—
Eaton, Richard B., 4,876,608, Cl. 358-443.000.

Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., 4,876,169, Cl. 430-110.000.

Hays, Dan A., 4,876,575, Cl. 355-259.000.

O'Neill, James F.; Drake, Donald J.; and Hawkins, William G., 4,875,968, Cl. 156-633.000.

Poehlein, Raymond E.; and Reese, Franklin S., 4,875,611, Cl. 226-186.000.

Schmidlin, Fred W., 4,876,561, Cl. 346-159.000.

Ziolo, Ronald F., 4,876,240, Cl. 505-1.000.

Xu, Zhiyou: *See*—
Wu, Han-Chin; and Xu, Zhiyou, 4,875,375, Cl. 73-795.000.

Yabe, Akira; Ouchi, Akihiko; Moriyama, Hiroshi; and Masuda, Etsuro, to Japan as represented by Director General of Agency of Industrial Science and Technology. Method for the preparation of polykis-azobenzenes. 4,875,986, Cl. 204-157.600.

Yabe, Masao, to Fuji Photo Film Co., Ltd. Recording medium of air-sandwich structure. 4,876,557, Cl. 346-137.000.

Yada, Toshio: *See*—
Maejima, Taro; Yada, Toshio; Tsutsumi, Michinari; Tabuchi, Tsuyoshi; Terazono, Takeshi; and Aoki, Masaru, 4,875,434, Cl. 118-52.000.

Yada, Yoshikuni: *See*—
Hashimoto, Noboru; Hitomi, Mitsuo; Onishi, Koji; Yada, Yoshikuni; Nobumoto, Hidetoshi; and Hotate, Makoto, 4,875,455, Cl. 123-568.000.

Yagihara, Morio: *See*—
Ishikawa, Takatoshi; and Yagihara, Morio, 4,876,174, Cl. 430-380.000.

Yakigaya, Nobuyuki: *See*—
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.

Yamada, Muneki; and Kawaguchi, Kiyoshi, to Toyo Seikan Kaisha, Ltd. Method of extruding and compression molding a multilayered article. 4,876,052, Cl. 264-148.000.

Yamaguchi, Kiyoshi; Endo, Azuchi; and Sakamoto, Kiichiro, to Fuji Photo Film Co., Ltd. CRT printing method and apparatus for making a print of an image with letters. 4,876,567, Cl. 355-20.000.

Yamaguchi, Rikizou: *See*—
Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, 4,876,451, Cl. 361-540.000.

Yamaguchi, Tadanori; Patton, Evan; Lane, Eric; and Yu, Simon, to Tektronix, Inc. Method for fabricating an isolation region in a semiconductor substrate. 4,876,214, Cl. 437-038.000.

Yamaguchi, Takamasa: *See*—
Shirafuji, Hideo; Yamaguchi, Takamasa; and Nogami, Ikuo, 4,876,195, Cl. 435-137.000.

Yamaguchi, Toshio: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,875,835, Cl. 417-295.000.

Yamaguchi, Yoshito: *See*—
Shimizu, Hiroshi; and Yamaguchi, Yoshito, 4,876,676, Cl. 368-63.000.

Yamakawa, Kazuo, to Minolta Camera Kabushiki Kaisha. Video projector lens system. 4,875,763, Cl. 350-432.000.

Yamakoshi, Kenichi: *See*—
Shimazu, Hideaki; Ito, Hiroshi; and Yamakoshi, Kenichi, 4,875,488, Cl. 128-694.000.

Yamamoto, Hiroshi: *See*—
Inoue, Kazushige; Yamamoto, Hiroshi; Hyodo, Hiroshi; and Kishimoto, Shinichi, 4,876,204, Cl. 436-46.000.

Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, to Hitachi Microcomputer Hitachi, Ltd. & Engineering, Ltd. MOS static type RAM having a variable load. 4,876,669, Cl. 365-189.010.

Yamamoto, Tadanobu: *See*—
Tomosada, Kenji; Kondo, Toshiro; Yamamoto, Tadanobu; and Hashino, Hiroshi, 4,875,704, Cl. 280-695.000.

Yamamoto, Takashi: *See*—
Ozawa, Yoshio; Yamamoto, Takashi; Shigaki, Takao; and Kaneko, Rokusaburo, 4,876,568, Cl. 355-56.000.

Yamamoto, Takeshi; Kondo, Kunio; Yoshimura, Hiroshi; Wada, Yoshihiro; and Wada, Fusazo, to Gunze Kabushiki Kaisha. Film for print laminates and thermocompression bonding process therefor. 4,876,139, Cl. 428-200.000.

Yamamoto, Yasuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Method for assembling associated components. 4,875,273, Cl. 29-467.000.

Yamamura, Hiroshisa: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Yamanaka, Motosuke: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,876,262, Cl. 514-318.000.

Yamanaka, Yoshifumi: *See*—
Kashima, Takayuki; Sakabe, Akira; and Yamanaka, Yoshifumi, 4,876,433, Cl. 219-130.510.

Yamane, Akio; Kawasoe, Tatsuro; Tsukumo, Noriko; and Miyoshi, Kenichi, to Wakunaga Seiyaku Kabushiki Kaisha. Poly-labelled oligonucleotide derivative. 4,876,335, Cl. 536-27.000.

Yamaoka, Shinobu: *See*—
Mishima, Osamu; Yamaoka, Shinobu; Fukunaga, Osamu; Tanaka, Junzo; and Era, Koh, 4,875,967, Cl. 156-605.000.

Yamasaki, Kouji: *See*—
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, 4,875,947, Cl. 148-113.000.

Yamashita, Seizi: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Murumoto, Katsuji; Koterazawa, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Takamatsu, Shuichi; Ishikura, Hisatugu; Yamamura, Hiroshisa; Tatsuzaki, Toru; Ohmae, Tsutomu; Okuyama, Toshiaki; Yamashita, Seizi; Saito, Shigeki; and Sakai, Masato, 4,875,539, Cl. 180-79.100.

Yamashita, Tsuneo: *See*—
Hisanaga, Yorisato; Shimokawa, Kazuhiro; Kawano, Toshihiko; Suita, Yasunori; and Yamashita, Tsuneo, 4,876,245, Cl. 514-29.000.

Yamazaki, Fumio: *See*—
Shindou, Yoshio; Kabeya, Motoo; Shimazu, Takashi; and Yamazaki, Fumio, 4,876,160, Cl. 428-623.000.

Yamazaki, Nobuo; and Kitamoto, Tatsuji, to Fuji Photo Film Co., Ltd. Method for preparing ferromagnetic iron oxide particles. 4,876,022, Cl. 252-62.560.

Yamazaki, Shunpei; and Mase, Akira, to Semiconductor Energy Laboratory Co., Ltd. Pressure sensor with a ferroelectric liquid crystal layer. 4,875,378, Cl. 73-862.040.

Yamazaki, Tatsuo: *See*—
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; and Yamazaki, Tatsuo, 4,876,119, Cl. 427-250.000.

Yanagimachi, Motoshige: *See*—
Oike, Hitoshi; and Yanagimachi, Motoshige, 4,875,961, Cl. 156-234.000.

Yanagisawa, Yohei: *See*—
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.

Yang, Jerry S. C. Low voltage illuminating lamp set with programmable output for garden use. 4,876,487, Cl. 315-362.000.

Yang, Robert K., to Warner-Lambert Company. Chewing gum composition and method of making same. 4,876,095, Cl. 426-3.000.

Yano, Takeshi: *See*—
Hasegawa, Hiroshi; Sugimoto, Koichi; Yano, Takeshi; Netsu, Tositada; Tani, Mitsukiyo; and Kojima, Tosaku, 4,875,618, Cl. 228-179.000.

Yao, Raymond C.: *See*—
Hamill, Robert L.; and Yao, Raymond C., 4,876,273, Cl. 514-451.000.

Yasuda, Tomio: *See*—
Kawai, Taneichi; Yasuda, Tomio; and Aoki, Koji, 4,876,649, Cl. 364-424.050.

Yasuma, Jun-ichi: *See*—
Ichihashi, Kouji; and Yasuma, Jun-ichi, 4,875,501, Cl. 137-625.640.

Yasumoto, Hiromichi: *See*—
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, 4,875,947, Cl. 148-113.000.

Yasunaga, Tadashi; and Sasazawa, Koji, to Fuji Photo Film Co., Ltd. Method for producing magnetic recording media. 4,876,113, Cl. 427-39.000.

Yatsu, Takeyuki: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,876,261, Cl. 514-307.000.

Yazaki, Akira: *See*—
Yoshida, Susumu; Nakagawa, Shizutoshi; Ushiroguchi, Tsuyoshi; Matsuura, Hiromichi; and Yazaki, Akira, 4,876,281, Cl. 514-517.000.

Yazaki Corporation: *See*—
Ishizuka, Shigeo; and Kuzuno, Katsutoshi, 4,875,873, Cl. 439-347.000.
Tsukamoto, Sakae, 4,875,433, Cl. 116-335.000.

Yeh, Chuen Y.; and Savini, Charles, to Exxon Research & Engineering Company. Process for preparation of keystones by oxidation of secondary alcohols using a trimetallic catalyst comprising molybdenum, rhenium and a group VIII noble metal. 4,876,392, Cl. 568-404.000.

Yellowstone Diagnostics Corporation: *See*—
Gustafson, Eric K.; Trebino, Rick; and Lee, John, 4,876,208, Cl. 436-531.000.

Yissum Research Development Co. of The Hebrew University of Jerusalem: *See*—
Mechoulam, Raphael; Feigenbaum, Jeffery J.; Lander, Naphtali; and Srebnik, Morris, 4,876,276, Cl. 514-454.000.

Yoakim, Christiane: *See*—
Guindon, Yvan; Girard, Yves; Lau, Cheuk K.; Fortin, Rejean; Rokach, Joshua; and Yoakim, Christiane, 4,876,246, Cl. 514-80.000.

Yoda, Takashi; and Watanabe, Tohru, to Kabushiki Kaisha Toshiba. Method of manufacturing semiconductor devices. 4,876,223, Cl. 437-228.000.

Yokota, Masaki: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,876,261, Cl. 514-307.000.

Yokoyama, Fumitomo: *See*—
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, 4,875,392, Cl. 74-867.000.
Yokoyama, Katsuya: *See*—
Kitamoto, Tatsuji; Yokoyama, Katsuya; and Sekiguchi, Takuji, 4,875,610, Cl. 226-10.000.
Yokoyama, Sho, to Tachi-S Co., Ltd. Automotive seat. 4,875,734, Cl. 297-284.000.
Yoneyama, Kouichi: *See*—
Sakata, Hirotsugu; Murasaki, Hiroaki; Hayano, Makoto; Hattori, Hitoshi; Morozumi, Naoya; Yoneyama, Kouichi; Suzuki, Isao; Sone, Junji; and Nagatomo, Shigemi, 4,875,839, Cl. 418-55.000.
Yoo, Seog C.: *See*—
Park, Ho J.; Rhim, Moo S.; Kim, Hak M.; Kim, Du H.; Yoo, Seog C.; Kim, Sang H.; Park, Sa Ng B.; Han, Ink S.; Park, Jong T.; and Kim, Si M., 4,876,040, Cl. 264-14.000.
Yorke, William J.: *See*—
Prest, David W.; and Yorke, William J., 4,875,951, Cl. 149-109.600.
Yoshida, Hiroshi: *See*—
Penzhorn, Ralf-Dieter; and Yoshida, Hiroshi, 4,875,945, Cl. 376-146.000.
Yoshida, Kakushiyou: *See*—
Ikeda, Hironosuke; Ezaki, Tadashi; Yoshida, Kakushiyou; Yamaguchi, Rikizou; and Suenaga, Kazuhiro, 4,876,451, Cl. 361-540.000.
Yoshida, Naruhito: *See*—
Egawa, Jiro; Yoshida, Naruhito; Kasai, Toshihiro; Nagasawa, Moriya; Ide, Naoaki; and Machida, Hironobu, 4,876,560, Cl. 346-153.100.
Yoshida, Shigeyuki; Musha, Atsushi; and Nonami, Takayuki, to Mitsubishi Denki Kabushiki Kaisha. Telephone set. 4,876,714, Cl. 379-433.000.
Yoshida, Susumu; Nakagawa, Shizutoshi; Ushiroguchi, Tsuyoshi; Matsuura, Hiromichi; and Yazaki, Akira, to Wakunaga Seiyaku Kabushiki Kaisha. Antifungal agents. 4,876,281, Cl. 514-517.000.
Yoshida, Takashi, to Fuji Electric Corporate Research and Development, Ltd. Amorphous photoelectric converting device. 4,875,944, Cl. 136-249.000.
Yoshida, Toshiki, to Nissho Corporation. Injection needle-detaching device. 4,875,265, Cl. 29-240.000.
Yoshida, Yasunari: *See*—
Karube, Yoshiyuki; Hayakawa, Toshimasa; and Yoshida, Yasunari, 4,875,790, Cl. 400-605.000.
Yoshida, Yoshihiro: *See*—
Hayashi, Tsutomu; Katoh, Masaie; Yakigaya, Nobuyuki; Nakamura, Kazuhiko; Yoshida, Yoshihiro; Nakajima, Yoshihiro; Saito, Mitsuru; and Kobayashi, Akio, 4,875,390, Cl. 74-731.000.
Yoshikawa, Haruhiko; and Kawai, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Ignition timing controlling device for an internal combustion engine. 4,875,450, Cl. 123-425.000.
Yoshikawa, Toshio, to NEC Corporation. Transmission system for transmitting multifrequency signals or modem signals with speech signals. 4,876,696, Cl. 375-5.000.
Yoshimitsu, Toshio: *See*—
Onuki, Toru; Sagawa, Junichi; Watanabe, Tamotsu; and Yoshimitsu, Toshio, 4,876,158, Cl. 428-565.000.
Yoshimoto, Masahiko: *See*—
Ohsawa, Hidefumi; Katayama, Akihiro; Hosokawa, Hiroshi; Sunohara, Izuru; and Yoshimoto, Masahiko, 4,876,610, Cl. 358-443.000.
Yoshimura, Hiroshi: *See*—
Yamamoto, Takeshi; Kondo, Kunio; Yoshimura, Hiroshi; Wada, Yoshihiro; and Wada, Fusazo, 4,876,139, Cl. 428-200.000.
Yoshimura, Toyofusa: *See*—
Akahoshi, Haruo; Murakami, Kanji; Kawamoto, Mineo; Tadokoro, Akio; and Yoshimura, Toyofusa, 4,876,177, Cl. 430-313.000.
Yoshinaga, Kazuo; Katagiri, Kazuharu; Kobayashi, Toyoko; and Shinjo, Kenji, to Canon Kabushiki Kaisha. Optically active composition, mesomorphic compound and liquid crystal device. 4,876,027, Cl. 252-299.650.
Yoshino, Eichi: *See*—
Shinomiya, Tsutomu; Yoshino, Eichi; Maki, Chihiro; Tojima, Hitoshi; Izai, Sadamu; Nakata, Akiro; and Tamura, Michiya, 4,875,960, Cl. 156-203.000.
Yoshino, Hirobumi: *See*—
Nakamura, Yoko; Kojima, Fumiyo; and Yoshino, Hirobumi, 4,876,571, Cl. 355-210.000.
Yoshino, Hiroyuki: *See*—
Kawano, Ikuo; Takiguchi, Tsuyoshi; Kimura, Norihisa; Yanagisawa, Yohei; Ashimi, Tokuji; and Yoshino, Hiroyuki, 4,876,103, Cl. 426-574.000.
Yoshioka, Ritsuo; Ueda, Makoto; Motora, Yoichi; and Nakamura, Mitsuharu, to Kabushiki Kaisha Toshiba. Control blade for nuclear reactor. 4,876,060, Cl. 376-333.000.
Yoshitomi, Yasuo: *See*—
Yamamoto, Sho; Minato, Osamu; Saeki, Makoto; Yoshitomi, Yasuo; Nakamura, Hideaki; and Kubotera, Masaaki, 4,876,669, Cl. 365-189.010.
Yoshizumi, Seiichi: *See*—
Gotou, Shizuo; Kagimasa, Toyohiko; and Yoshizumi, Seiichi, 4,876,646, Cl. 364-200.000.
Young, Grant A.; Wakley, William D.; and Andrews, Steven L., to Amoco Corporation. Method of controlling the separation efficiency of a hydrocyclone. 4,876,016, Cl. 210-739.000.
Young, Harold R.: *See*—
McSpadden, John S.; Leatherman, Russel D.; and Young, Harold R., 4,876,653, Cl. 364-479.000.
Young, Lloyd L. Shooting tab. 4,875,458, Cl. 124-35.00A.
Young, Robert W.: *See*—
Marsh, Stephen A.; and Young, Robert W., 4,875,358, Cl. 73-40.000.
Youngren, David J.: *See*—
Youngren, John H.; and Youngren, David J., 4,875,760, Cl. 350-102.000.
Youngren, John H.; and Youngren, David J. Reflective prism assembly. 4,875,760, Cl. 350-102.000.
Yourd, Raymond A., III: *See*—
Gruber, Robert J.; Yourd, Raymond A., III; Malhotra, Shadi L.; Nelson, Robert A.; Fox, Carol A.; and Hoffend, Thomas R., 4,876,169, Cl. 430-110.000.
Yu, Simon: *See*—
Yamaguchi, Tadanori; Patton, Evan; Lane, Eric; and Yu, Simon, 4,876,214, Cl. 437-038.000.
Yunokuchi, Ryu; Omori, Shinichi; and Ohkita, Masao, to Alps Electric Co., Ltd. Method of producing magnetic head device. 4,875,276, Cl. 29-603.000.
Yusa, Toshikazu. Mounting container for measuring instruments. 4,875,381, Cl. 73-866.300.
Yusa, Yasuhiko: *See*—
Koike, Eishi; and Yusa, Yasuhiko, 4,876,678, Cl. 369-31.000.
Zafiroglu, Dimitri P., to Du Pont de Nemours, E. I., and Company. Stitchbonded nonwoven fabric. 4,876,128, Cl. 428-102.000.
Zagorodnaya, Galina A.: *See*—
Khutoretsky, Garri M.; Tjurin, Jury G.; Varshavsky, Vladimir D.; Zagorodnaya, Galina A.; and Fridman, Vladimir M., 4,876,469, Cl. 310-52.000.
Zahring, Gerhard: *See*—
Willkop, Franz; Zahring, Gerhard; Rutsch, Robert; Popp, Joachim; and Eberhard, John, 4,875,828, Cl. 415-173.400.
Zaidan Hojin Biseibutsu Kagaku: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,876,244, Cl. 514-19.000.
Zaiden Hojin Handotai Kenkyu Shinkokai: *See*—
Nishizawa, Jun-ichi, 4,876,580, Cl. 357-22.000.
Zaizen, Youichi: *See*—
Nakayama, Hisanobu; Tanaka, Osamu; Yasumoto, Hiromichi; Senoo, Seiichi; Zaizen, Youichi; and Yamasaki, Kouji, 4,875,947, Cl. 148-113.000.
Zakman, Zdravko M., to Motorola, Inc. Internally mounted broadband antenna. 4,876,552, Cl. 343-702.000.
Zakraysek, Louis: *See*—
Belke, Robert E.; Zakraysek, Louis; and Pillar, Walter O., 4,876,120, Cl. 428-1.000.
Zaoralek, Heinz-Michael, to Schwabische Huttenwerke GmbH. Device for treating a material web. 4,875,297, Cl. 34-48.000.
Zavody na vyrobu lozisk, Povazska Bystrica: *See*—
Rajsigl, Zdenek; and Kriz, Frantisek, 4,875,334, Cl. 57-406.600.
Zdebel, Peter J., to Motorola Inc. Method of forming semiconductor structure isolation regions. 4,876,217, Cl. 437-67.000.
Zebco Corporation: *See*—
Zurcher, John A., 4,875,639, Cl. 242-309.000.
Zehnder, Paul; Niklaus, Hans-Ulrich; Schmiedl, Engelbert; and Patri, Franz, to K. Rutschi AG. Self-sucking pump apparatus for liquids. 4,875,836, Cl. 417-360.000.
Zeiss Ikon AG: *See*—
Ballmer, Horst; and Grosskopf, Rudolf, 4,876,535, Cl. 340-825.340.
Zenith Electronics Corporation: *See*—
Citta, Richard W.; Gosc, Paul M.; Mutzabaugh, Dennis M.; and Sgrignoli, Gary J., 4,876,718, Cl. 380-42.000.
Palac, Kazimir, deceased; Palac, Judith A., heir; Palac, Donald T., heir; and Palac, Susan M., heir, 4,876,480, Cl. 313-477.00R.
Ziegler, Frank A.: *See*—
Woodworth, Donald J.; Ziegler, Frank A.; and Grabenstein, James B., 4,876,737, Cl. 455-12.000.
Ziemelis, Maris J.: *See*—
Lo, Peter Y. K.; and Ziemelis, Maris J., 4,876,039, Cl. 264-4.700.
Ziemer, Wolf, to Flaakt AB. Method and device for checking filters. 4,875,360, Cl. 73-40.700.
Zillig, Steven R.: *See*—
Caroll, James E.; and Zillig, Steven R., 4,875,709, Cl. 285-14.000.
Zimmer, Karl A. Weight lifting machine for safe free-bar bench press exercising. 4,875,676, Cl. 272-123.000.
Zinser Textilmaschinen GmbH: *See*—
Gunkinger, Siegfried, 4,875,256, Cl. 19-159.00A.
Ziolo, Ronald F., to Xerox Corporation. Processes for the preparation of copper oxide superconductors. 4,876,240, Cl. 505-1.000.
Zittel, David R., to Lyco Manufacturing, Inc. Chiller. 4,875,344, Cl. 62-381.000.
Zitz, Alfred; and Brandl, Erich, to Voest-Alpine Maschinenbau Gesellschaft m.b.H. Arm-supported cutting roll with effective length pivotally adjustable along mining face. 4,875,738, Cl. 299-80.000.
Zlupko, John E.: *See*—
Miller, Richard; and Zlupko, John E., 4,876,421, Cl. 200-144.00C.
Zolper, John C.: *See*—
Barnett, Allen M.; and Zolper, John C., 4,876,210, Cl. 437-5.000.
Zon, Arie Van; and Coleman, Brian, to Shell Oil Company. Lubricating oil composition. 4,876,020, Cl. 252-40.500.
Zuercher, Erwin: *See*—
Vermot-Gaud, Jacque; Cottenceau, Remi; and Zuercher, Erwin, 4,875,347, Cl. 66-219.000.
Zurcher, John A., to Zebco Corporation. Depth setting device for a spinning reel. 4,875,639, Cl. 242-309.000.
Zurwelle, Donald W.: *See*—
Bunyea, Roderick F.; and Zurwelle, Donald W., 4,875,879, Cl. 439-501.000.
Zwirn, Robert; and Rafanelli, Gerard L., to Hughes Aircraft Company. Electronic focus correction by signal convolution. 4,876,602, Cl. 358-227.000.
501 Atari Games: *See*—
Van Elderen, Daniel N.; and Lichac, Gerald J., 4,875,459, Cl. 124-49.000.
501 Hydrosplash Enterprises, Inc.: *See*—
Erickson, Curtis, 4,875,673, Cl. 272-71.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 24TH DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Burndy Corporation: *See*—
Center, Warren A., Re. 33,098, Cl. 60-635.000.

Center, Warren A., to Burndy Corporation. Explosively-operated tool. Re. 33,098, Cl. 60-635.000.

DEN-MAT Corporation: *See*—
Ibsen, Robert L.; Glace, William R.; and Pacropis, Donald R., Re. 33,100, Cl. 106-35.000.

Glace, William R.: *See*—
Ibsen, Robert L.; Glace, William R.; and Pacropis, Donald R., Re. 33,100, Cl. 106-35.000.

Ibsen, Robert L.; Glace, William R.; and Pacropis, Donald R., to DEN-MAT Corporation. Dental compositions incorporating glass ionomers. Re. 33,100, Cl. 106-35.000.

Nenna, Vito. Method of forming the primary core of a prestressed concrete pipe. Re. 33,101, Cl. 264-71.000.

Pacropis, Donald R.: *See*—
Ibsen, Robert L.; Glace, William R.; and Pacropis, Donald R., Re. 33,100, Cl. 106-35.000.

Shoher, Itzhak; and Whiteman, Aharon. Dental crown, coping and method. Re. 33,099, Cl. 433-222.100.

Whiteman, Aharon: *See*—
Shoher, Itzhak; and Whiteman, Aharon, Re. 33,099, Cl. 433-222.100.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Blucher, Hubert; von Blucher, Hasso; and de Ruiter, Ernest. Filter sheet material. B1 4,510,193, 10-24-89, Cl. 428-196.000.

de Ruiter, Ernest: *See*—
Blucher, Hubert; von Blucher, Hasso; and de Ruiter, Ernest, B1 4,510,193, Cl. 428-196.000.

Excello Specialty Company, The: *See*—
Isaksen, Robert A.; Frappier, David E.; and Jones, Wallace R., B1 4,588,627, Cl. 428-80.000.

Frappier, David E.: *See*—
Isaksen, Robert A.; Frappier, David E.; and Jones, Wallace R., B1 4,588,627, Cl. 428-80.000.

Isaksen, Robert A.; Frappier, David E.; and Jones, Wallace R., to Excello Specialty Company, The. Deflector for vehicle body components. B1 4,588,627, 10-24-89, Cl. 428-80.000.

Jones, Wallace R.: *See*—
Isaksen, Robert A.; Frappier, David E.; and Jones, Wallace R., B1 4,588,627, Cl. 428-80.000.

Noss Company: *See*—
Wikdahl, Nils A. L., B1 3,415,374, Cl. 209-211.000.

Pelikan AG: *See*—
von Wartburg, Rene, B1 4,246,033, Cl. 106-23.000.

Schubert, Hans A.; and Schulze, Klaus, to SMS Hasenclever Maschinenfabrik GmbH. Forging press of underfloor design. B1 4,607,518, 10-24-89, Cl. 72-453.120.

Schulze, Klaus: *See*—
Schubert, Hans A.; and Schulze, Klaus, B1 4,607,518, Cl. 72-453.120.

SMS Hasenclever Maschinenfabrik GmbH: *See*—
Schubert, Hans A.; and Schulze, Klaus, B1 4,607,518, Cl. 72-453.120.

von Blucher, Hasso: *See*—
Blucher, Hubert; von Blucher, Hasso; and de Ruiter, Ernest, B1 4,510,193, Cl. 428-196.000.

von Wartburg, Rene, to Pelikan AG. Arrangement for applying written or drawn information onto image carriers for overhead projection. B1 4,246,033, 10-24-89, Cl. 106-23.000.

Wikdahl, Nils A. L., to Noss Company. Method and apparatus for vortical separation of solids. B1 3,415,374, 10-24-89, Cl. 209-211.000.

LIST OF DESIGN PATENTEES

Abe, Yoshinori: *See*—
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,170, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,171, Cl. D13-4.000.

Adolfo, Boldrini, to Ing. Enea Mattei S.p.A. Air compressor. 304,197, 10-24-89, Cl. D15-9.000.

Aizawa, Junichi; Kumazawa, Shoichiro; Yamauchi, Satoru; and Kondo, Isao, to Seikosha Co., Ltd. Electromagnetic bell. 304,163, 10-24-89, Cl. D10-116.000.

Alexander, Kenneth: *See*—
Ramsey, Maynard, III; Muskatello, James; Burton, Arthur; Alexander, Kenneth; and George, John, 304,233, Cl. D24-21.000.

Alloy Tool and Mold, Mfg., Corp. (ATM): *See*—
Kleinert, York, 304,158, Cl. D9-375.000.
Kleinert, York, 304,159, Cl. D9-375.000.

Aloys F. Dornbracht GmbH & Co. KG: *See*—
Lathrop, Bethany, 304,225, Cl. D23-257.000.

Anesi, Dennis W.: *See*—
Wilson, Dennis A.; Anesi, Dennis W.; and Williamsen, Mark S., 304,224, Cl. D23-245.000.

Ansan Industries Ltd.: *See*—
Wilson, Dennis A.; Anesi, Dennis W.; and Williamsen, Mark S., 304,224, Cl. D23-245.000.

Avia Group International, Inc.: *See*—
Kolman, Kenneth R.; Nyberg, Michael J.; Cote, Richard W.; Fuerst, Rory W.; and Granville, James, 304,128, Cl. D2-314.000.
Mourad, Miza, 304,127, Cl. D2-314.000.

Beaton, Larry G.; McClain, Kevin T.; Vitello, Jonathan J.; Wetzel, Timothy D.; and Williams, Roger C., to International Business Machines Corporation. Computer display. 304,179, 10-24-89, Cl. D14-113.000.

Benfield, Bruce V.; Benfield, Peter J.; Pyyvaara, Tim T.; Bishop, Victor L.; and Speck, Stuart L., to Heatshield PTY. Ltd. Fireplace. 304,227, 10-24-89, Cl. D23-344.000.

Benfield, Peter J.: *See*—
Benfield, Bruce V.; Benfield, Peter J.; Pyyvaara, Tim T.; Bishop, Victor L.; and Speck, Stuart L., 304,227, Cl. D23-344.000.

Bertrand, Vic, to Ritvik Group Inc., The. Axle element for a construction toy. 304,220, 10-24-89, Cl. D21-141.000.

Beverly Hills Trading Company, Inc.: *See*—
Rezek, Ron, 304,229, Cl. D23-377.000.

Bishop, Victor L.: *See*—
Benfield, Bruce V.; Benfield, Peter J.; Pyyvaara, Tim T.; Bishop, Victor L.; and Speck, Stuart L., 304,227, Cl. D23-344.000.

Bounds, William E. Condiment mill. 304,142, 10-24-89, Cl. D7-53.000.

Buist, Kevin S., to Design Visions, Inc. Hexagonal locking toy block. 304,214, 10-24-89, Cl. D21-108.000.

Bull HN Information Systems Inc.: *See—*
Cesarczyk, Edward J.; and Dillon, Richard R., 304,176, Cl. D14-102.000.

Burton, Arthur: *See—*
Ramsey, Maynard, III; Muskatello, James; Burton, Arthur; Alexander, Kenneth; and George, John, 304,233, Cl. D24-21.000.

C & S Manufacturing: *See—*
Fonte, Frank, 304,210, Cl. D21-81.000.

Calkins, Durward W., to Cincinnati Time, Inc. Computer controlled time clock with fold-up keyboard. 304,162, 10-24-89, Cl. D10-41.000.

Canon Kabushiki Kaisha: *See—*
Komatsu, Hiroshi, 304,187, Cl. D14-118.000.
Takahashi, Masaki, 304,182, Cl. D14-118.000.
Wada, Eiko; and Seki, Yuichi, 304,204, Cl. D18-37.000.
Yoshihara, Tsutomu, 304,185, Cl. D14-118.000.

Carpenter, James H., to Pangborn Corporation, Inc. Vane for throwing wheel. 304,199, 10-24-89, Cl. D15-126.000.

Casselman, Michael D. Gas can rack. 304,133, 10-24-89, Cl. D6-420.000.

Cesarczyk, Edward J.; and Dillon, Richard R., to Bull HN Information Systems Inc. Expandable central processing system. 304,176, 10-24-89, Cl. D14-102.000.

Chambers, Arthur E. Foot bath. 304,235, 10-24-89, Cl. D24-38.000.

Chapin, David S.; and Farnham, Gilbert R., to Cooper Industries, Inc. Refillable propane torch. 304,151, 10-24-89, Cl. D8-30.000.

Chen, Chen-Tsung. Toy construction ring. 304,213, 10-24-89, Cl. D21-108.000.

Chonan, Katsuhiko: *See—*
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,170, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,171, Cl. D13-4.000.

Christian, Kristy L.; Ridley, Fred A., Jr.; and Ridley, Clay K. Sandal. 304,126, 10-24-89, Cl. D2-293.000.

Cincinnati Time, Inc.: *See—*
Calkins, Durward W., 304,162, Cl. D10-41.000.

Cooper Industries, Inc.: *See—*
Chapin, David S.; and Farnham, Gilbert R., 304,151, Cl. D8-30.000.

Cote, Richard W.: *See—*
Kolman, Kenneth R.; Nyberg, Michael J.; Cote, Richard W.; Fuerst, Rory W.; and Granville, James, 304,128, Cl. D2-314.000.

Cranston, William V., III; Martin, Randall W.; Small, Mark S.; and Young, Mark A., to International Business Machines Corp. Disk drive shroud enclosure for an industrial computer. 304,178, 10-24-89, Cl. D14-109.000.

Creative Athletic Products and Services, Inc.: *See—*
Wright, Robert L., 304,240, Cl. D25-1.000.

Critikon, Inc.: *See—*
Ramsey, Maynard, III; Muskatello, James; Burton, Arthur; Alexander, Kenneth; and George, John, 304,233, Cl. D24-21.000.

Culbertson, Richard, to General Electric Company. Front and side panels for a two-way mobile radio. 304,195, 10-24-89, Cl. D14-265.000.

Daykin, Kevin, to Hestair Keddicraft Limited. Teether. 304,237, 10-24-89, Cl. D24-45.000.

Dennis, William M. Soft drink carrier. 304,143, 10-24-89, Cl. D7-70.000.

Design Visions, Inc.: *See—*
Buist, Kevin S., 304,214, Cl. D21-108.000.

Diebold, Incorporated: *See—*
Long, Douglas G., 304,198, Cl. D15-9.100.

Dillon, Richard R.: *See—*
Cesarczyk, Edward J.; and Dillon, Richard R., 304,176, Cl. D14-102.000.

Discovery Toys, Inc.: *See—*
Klitsner, Daniel B., 304,216, Cl. D21-108.000.
Klitsner, Daniel B., 304,217, Cl. D21-108.000.
Klitsner, Daniel B., 304,218, Cl. D21-108.000.

E&G Classics, Inc.: *See—*
Eash, David D.; and Hannas, Richard, 304,167, Cl. D12-156.000.

Eash, David D.; and Hannas, Richard, to E&G Classics, Inc. Decorative top adapted to be placed over the existing roof of a truck. 304,167, 10-24-89, Cl. D12-156.000.

Eastern Company, The: *See—*
Russell, Richard H.; and Kaiser, David W., 304,155, Cl. D8-303.000.

Edmonds Medical Systems, Inc.: *See—*
Keller, Jeff; and Linton, Robert, 304,222, Cl. D21-192.000.

Elm Industry Co., Ltd.: *See—*
Tanigami, Shintaro, 304,131, Cl. D3-72.000.

Elrod, Elliot. Litter scoop. 304,248, 10-24-89, Cl. D30-162.000.

Farnham, Gilbert R.: *See—*
Chapin, David S.; and Farnham, Gilbert R., 304,151, Cl. D8-30.000.

Ferguson, William R. Electronically controlled clothing receptacle or similar article. 304,252, 10-24-89, Cl. D32-37.000.

Fonte, Frank, to C & S Manufacturing. Scooter. 304,210, 10-24-89, Cl. D21-81.000.

Frank Coleman (Luton) Limited: *See—*
Goldman, Neil V. H., 304,160, Cl. D9-433.000.

Frassati, Guido; Muglialdo, Giuseppe; and Valvassori, Riccardo, to S.A.M.E.S. S.p.A. Electrical track for a room lighting system. 304,173, 10-24-89, Cl. D13-13.000.

Fratelli Guzzini S.p.A.: *See—*
Gecchelin, Bruno, 304,144, Cl. D7-102.000.
Gecchelin, Bruno, 304,145, Cl. D7-104.000.

Fuerst, Rory W.: *See—*
Kolman, Kenneth R.; Nyberg, Michael J.; Cote, Richard W.; Fuerst, Rory W.; and Granville, James, 304,128, Cl. D2-314.000.

Fuller, Kip L., to Guardian Technologies, Inc. Breath sample receiving mouthpiece. 304,232, 10-24-89, Cl. D24-17.000.

Fuller, Thomas G.; Stock, Michael H.; and Weckel, Hoawrd F., III, to Mito Corporation. Radio cabinet front. 304,194, 10-24-89, Cl. D14-257.000.

GEC Plessey Telecommunications Ltd.: *See—*
Rose, Martin S., 304,190, Cl. D14-142.000.

Gecchelin, Bruno, to Fratelli Guzzini S.p.A. Spatula. 304,144, 10-24-89, Cl. D7-102.000.

Gecchelin, Bruno, to Fratelli Guzzini S.p.A. Spoon. 304,145, 10-24-89, Cl. D7-104.000.

General Electric Company: *See—*
Culbertson, Richard, 304,195, Cl. D14-265.000.

George, John: *See—*
Ramsey, Maynard, III; Muskatello, James; Burton, Arthur; Alexander, Kenneth; and George, John, 304,233, Cl. D24-21.000.

Ghetti, Clifford: *See—*
Hassel, H. Charles; and Ghetti, Clifford, 304,250, Cl. D32-18.000.

Gibson, Robert J. Retainer for a computer mouse. 304,180, 10-24-89, Cl. D14-114.000.

Giese, Robert C.; and Poulson, Keith L., to Kohler Co. Tub shell for a hydrotherapy spa or the like. 304,236, 10-24-89, Cl. D24-38.000.

Giles, William E.; and Kapp, Joseph P., to Trucker's Comfort Systems, Inc. Utility receptacle cover. 304,174, 10-24-89, Cl. D13-31.000.

Goldman, Neil V. H., to Frank Coleman (Luton) Limited. Carton blank. 304,160, 10-24-89, Cl. D9-433.000.

Goodyear Tire & Rubber Company, The: *See—*
Graas, Maurice, 304,166, Cl. D12-143.000.

Graas, Maurice, to Goodyear Tire & Rubber Company, The. Tire. 304,166, 10-24-89, Cl. D12-143.000.

Granville, James: *See—*
Kolman, Kenneth R.; Nyberg, Michael J.; Cote, Richard W.; Fuerst, Rory W.; and Granville, James, 304,128, Cl. D2-314.000.

Great Western Trading Corp.: *See—*
Ross, Robert M., Jr.; and McNally, Robert J., 304,246, Cl. D30-102.000.
Ross, Robert M., Jr.; and McNally, Robert J., 304,247, Cl. D30-102.000.

Green, David T.; and Ratcliff, Keith, to United States Surgical Corporation. Annular anvil for a surgical stapler. 304,234, 10-24-89, Cl. D24-27.000.

Griffiths, Thomas R. Telephone shelter. 304,134, 10-24-89, Cl. D6-421.000.

GTE Products Corporation: *See—*
Zwald, John J., 304,243, Cl. D26-4.000.

Guardian Technologies, Inc.: *See—*
Fuller, Kip L., 304,232, Cl. D24-17.000.

Guidotti, James M. Game board design. 304,209, 10-24-89, Cl. D21-34.000.

Gurganus, Marvin E. Support bracket for holding load locks when not in use for mounting on a beam behind the cab of a truck vehicle. 304,168, 10-24-89, Cl. D12-157.000.

Handler, Milton E.; and Peterson, Michael, to Hirsh Company. Implement holder. 304,137, 10-24-89, Cl. D6-569.000.

Hannas, Richard: *See—*
Eash, David D.; and Hannas, Richard, 304,167, Cl. D12-156.000.

Hara, Kunio, to Kabushiki Kaisha Toshiba. Electronic copying machine. 304,177, 10-24-89, Cl. D14-107.000.

Hara, Kunio; and Hiroki, Shin-ichi, to Kabushiki Kaisha Toshiba. Facsimile. 304,183, 10-24-89, Cl. D14-118.000.

Hassel, H. Charles; and Ghetti, Clifford, to MicroComputer Accessories Inc. Hand held vacuum cleaner. 304,250, 10-24-89, Cl. D32-18.000.

Hayasaka, Sigeki; and Takahashi, Mamoru, to NEC Corporation. Radio pager. 304,192, 10-24-89, Cl. D14-191.000.

Heatshield PTY. Ltd.: *See—*
Benfield, Bruce V.; Benfield, Peter J.; Pyyvaara, Tim T.; Bishop, Victor L.; and Speck, Stuart L., 304,227, Cl. D23-344.000.

Hestair Keddicraft Limited: *See—*
Daykin, Kevin, 304,237, Cl. D24-45.000.

Hiroki, Shin-ichi: *See—*
Hara, Kunio; and Hiroki, Shin-ichi, 304,183, Cl. D14-118.000.

Hirsh Company: *See—*
Handler, Milton E.; and Peterson, Michael, 304,137, Cl. D6-569.000.

Holewinski, Robert D., to Johnson & Johnson Consumer Products, Inc. Package for dental products. 304,157, 10-24-89, Cl. D9-347.000.

Hoshino, Michio; Ikegami, Masakazu; and Sato, Hajime, to Mabuchi Motor Co., Ltd. Electric motor. 304,169, 10-24-89, Cl. D13-1.000.

Ianni, Rosemarie. Hair care appliance stand. 304,245, 10-24-89, Cl. D28-73.000.

Ichihara, Masuo: *See—*
Kubo, Masayoshi; Kido, Katsutoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 304,150, Cl. D7-351.000.
Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Ichihara, Masuo, 304,148, Cl. D7-351.000.

Iinuma, Hideo: *See—*
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,170, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,171, Cl. D13-4.000.

Ikegami, Masakazu: *See—*
Hoshino, Michio; Ikegami, Masakazu; and Sato, Hajime, 304,169, Cl. D13-1.000.

Imanishi Kinzoku Kogyo Kabushiki Kaisha: *See*—
Nishikawa, Hideo; Okamoto, Kenzo; and Kitada, Fumihiko, 304,149, Cl. D7-351.000.
Ing. Enea Mattei S.p.A.: *See*—
Adolfo, Boldrini, 304,197, Cl. D15-9.000.
Interlego A.G.: *See*—
Knudsen, Jens N., 304,215, Cl. D21-108.000.
Poulsen, Ole V., 304,221, Cl. D21-141.000.
Tapdrup, Erik P., 304,211, Cl. D21-91.000.
International Business Machines Corporation: *See*—
Beaton, Larry G.; McClain, Kevin T.; Vitello, Jonathan J.; Wetzel, Timothy D.; and Williams, Roger C., 304,179, Cl. D14-113.000.
Cranston, William V., III; Martin, Randall W.; Small, Mark S.; and Young, Mark A., 304,178, Cl. D14-109.000.
Ito, Eiji: *See*—
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,170, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,171, Cl. D13-4.000.
Jackson, Richard A. Belt mounted clip board holder. 304,132, 10-24-89, Cl. D3-100.000.
John Manufacturing Limited: *See*—
Yuen, John S., 304,249, Cl. D32-18.000.
Johnson & Johnson Consumer Products, Inc.: *See*—
Holewinski, Robert D., 304,157, Cl. D9-347.000.
Kabushiki Kaisha Toshiba: *See*—
Hara, Kunio, 304,177, Cl. D14-107.000.
Hara, Kunio; and Hiroki, Shin-ichi, 304,183, Cl. D14-118.000.
Kamei, Taketo; and Saigo, Masashi, 304,241, Cl. D26-3.000.
Sutoh, Shigeru, 304,188, Cl. D14-138.000.
Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishiro, Benito, to Matsushita Electric Industrial Co., Ltd. Scanner for computer. 304,181, 10-24-89, Cl. D14-116.000.
Kaiser, David W.: *See*—
Russell, Richard H.; and Kaiser, David W., 304,155, Cl. D8-303.000.
Kamei, Taketo; and Saigo, Masashi, to Kabushiki Kaisha Toshiba. Fluorescent lamp tube. 304,241, 10-24-89, Cl. D26-3.000.
Kapp, Joseph P.: *See*—
Giles, William E.; and Kapp, Joseph P., 304,174, Cl. D13-31.000.
Kato, Shuzo; Sakama, Satoru; and Takahashi, Tamihei, to NCR Corporation. Slip printer or similar article. 304,203, 10-24-89, Cl. D18-13.000.
Kawamura, Masaki: *See*—
Sakaguchi, Hiroshi; and Kawamura, Masaki, 304,175, Cl. D14-100.000.
Keller, Jeff; and Linton, Robert, to Edmonds Medical Systems, Inc. Combined underwater treadmill and station therefor. 304,222, 10-24-89, Cl. D21-192.000.
Kido, Katsutoshi: *See*—
Kubo, Masayoshi; Kido, Katsutoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 304,150, Cl. D7-351.000.
Kim, Mee S.: *See*—
Kim, Yun S.; and Kim, Mee S., 304,226, Cl. D23-267.000.
Kim, Yun S.; and Kim, Mee S. Cover for jars of fragrance, jewelry or similar article. 304,226, 10-24-89, Cl. D23-267.000.
Kitada, Fumihiko: *See*—
Nishikawa, Hideo; Okamoto, Kenzo; and Kitada, Fumihiko, 304,149, Cl. D7-351.000.
Kleinert, York, to Alloy Tool and Mold, Mfg., Corp. (ATM). Bottle. 304,158, 10-24-89, Cl. D9-375.000.
Kleinert, York, to Alloy Tool and Mold, Mfg., Corp. (ATM). Bottle. 304,159, 10-24-89, Cl. D9-375.000.
Klitsner, Daniel B., to Discovery Toys, Inc. Simulative construction toy. 304,216, 10-24-89, Cl. D21-108.000.
Klitsner, Daniel B., to Discovery Toys, Inc. Frog construction toy. 304,217, 10-24-89, Cl. D21-108.000.
Klitsner, Daniel B., to Discovery Toys, Inc. Lily pad construction toy. 304,218, 10-24-89, Cl. D21-108.000.
Kmetz, David G., to Stanley Works, The. Cordless screwdriver. 304,152, 10-24-89, Cl. D8-68.000.
Knudsen, Jens N., to Interlego A.G. Bevelled toy construction element. 304,215, 10-24-89, Cl. D21-108.000.
Kohler Co.: *See*—
Giese, Robert C.; and Poulson, Keith L., 304,236, Cl. D24-38.000.
Kojima, Fumiyo, to Ricoh Company, Ltd. Combined copying machine, facsimile transmitter/receiver and printer. 304,186, 10-24-89, Cl. D14-118.000.
Kokusai Denki Kabushiki Kaisha: *See*—
Sekine, Isamu, 304,191, Cl. D14-192.000.
Kolman, Kenneth R.; Nyberg, Michael J.; Cote, Richard W.; Fuerst, Rory W.; and Granville, James, to Avia Group International, Inc. Shoe upper. 304,128, 10-24-89, Cl. D2-314.000.
Komatsu, Hiroshi, to Canon Kabushiki Kaisha. Facsimile. 304,187, 10-24-89, Cl. D14-118.000.
Kondo, Isao: *See*—
Aizawa, Junichi; Kumazawa, Shoichiro; Yamauchi, Satoru; and Kondo, Isao, 304,163, Cl. D10-116.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Power inverter. 304,170, 10-24-89, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Power inverter. 304,171, 10-24-89, Cl. D13-4.000.
Kubo, Masayoshi; Kido, Katsutoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 304,150, 10-24-89, Cl. D7-351.000.
Kubo, Masayoshi: *See*—
Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Ichihara, Masuo, 304,148, Cl. D7-351.000.
Kumazawa, Shoichiro: *See*—
Aizawa, Junichi; Kumazawa, Shoichiro; Yamauchi, Satoru; and Kondo, Isao, 304,163, Cl. D10-116.000.
Kushitani, Hisashi. Boot for a motorcyclist. 304,125, 10-24-89, Cl. D2-275.000.
Larson, Lawrence L.: *See*—
Ruger, William B.; and Larson, Lawrence L., 304,223, Cl. D22-108.000.
Lathrop, Bethany, to Aloys F. Dornbracht GmbH & Co. KG. Spout. 304,225, 10-24-89, Cl. D23-257.000.
Laurel-Plastic Kurt Lorber: *See*—
Lorber, Kurt; and Lorber, Beate, 304,205, Cl. D19-65.000.
Li, Yung-To. Juice presser or similar article. 304,140, 10-24-89, Cl. D7-49.000.
Li, Yung-To. Juice presser or similar article. 304,141, 10-24-89, Cl. D7-49.000.
Linton, Robert: *See*—
Keller, Jeff; and Linton, Robert, 304,222, Cl. D21-192.000.
Loftus, Frank. Lottery die. 304,208, 10-24-89, Cl. D21-41.000.
Long, Douglas G., to Diebold, Incorporated. Motor fuel dispensing control terminal or similar article. 304,198, 10-24-89, Cl. D15-9.100.
Lorber, Beate: *See*—
Lorber, Kurt; and Lorber, Beate, 304,205, Cl. D19-65.000.
Lorber, Kurt; and Lorber, Beate, to Laurel-Plastic Kurt Lorber. Paper clip. 304,205, 10-24-89, Cl. D19-65.000.
Lotz, Willi, to Mitel Corporation. Cartridge for telephone system equipment cabinet. 304,193, 10-24-89, Cl. D14-240.000.
Lune-Ching Hu: *See*—
Mergenov, George, 304,135, Cl. D6-477.000.
Lyall, Gordon M.; and McCarron, Philip F., to Simpson-Lawrence Limited. Vertical marine windlass. 304,254, 10-24-89, Cl. D34-33.000.
Mabuchi Motor Co., Ltd.: *See*—
Hoshino, Michio; Ikegami, Masakazu; and Sato, Hajime, 304,169, Cl. D13-1.000.
MacKelvie, Philip A., to Technical Tools, Inc. Holder for tool setter gauge. 304,200, 10-24-89, Cl. D15-140.000.
Martin, Randall W.: *See*—
Cranston, William V., III; Martin, Randall W.; Small, Mark S.; and Young, Mark A., 304,178, Cl. D14-109.000.
Matoba, Hisayoshi: *See*—
Kubo, Masayoshi; Kido, Katsutoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 304,150, Cl. D7-351.000.
Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Ichihara, Masuo, 304,148, Cl. D7-351.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishiro, Benito, 304,181, Cl. D14-116.000.
Kubo, Masayoshi; Kido, Katsutoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 304,150, Cl. D7-351.000.
Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Ichihara, Masuo, 304,148, Cl. D7-351.000.
McCarron, Philip F.: *See*—
Lyall, Gordon M.; and McCarron, Philip F., 304,254, Cl. D34-33.000.
McClain, Kevin T.: *See*—
Beaton, Larry G.; McClain, Kevin T.; Vitello, Jonathan J.; Wetzel, Timothy D.; and Williams, Roger C., 304,179, Cl. D14-113.000.
McNally, Robert J.: *See*—
Ross, Robert M., Jr.; and McNally, Robert J., 304,246, Cl. D30-102.000.
Ross, Robert M., Jr.; and McNally, Robert J., 304,247, Cl. D30-102.000.
Mepal B.V.: *See*—
Weernink, Johannes H., 304,138, Cl. D7-17.000.
Weernink, Johannes H., 304,146, Cl. D7-317.000.
Mergenov, George, to Lune-Ching Hu. Table. 304,135, 10-24-89, Cl. D6-477.000.
MicroComputer Accessories Inc.: *See*—
Hassel, H. Charles; and Ghetti, Clifford, 304,250, Cl. D32-18.000.
Miles, Bernard. Mold plate adapter. 304,139, 10-24-89, Cl. D7-43.000.
Miller, Kevin. Body waste collection bag stand. 304,239, 10-24-89, Cl. D24-51.000.
Mishiro, Benito: *See*—
Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishiro, Benito, 304,181, Cl. D14-116.000.
Mitel Corporation: *See*—
Lotz, Willi, 304,193, Cl. D14-240.000.
Mito Corporation: *See*—
Fuller, Thomas G.; Stock, Michael H.; and Weckel, Hoawrd F., III, 304,194, Cl. D14-257.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,170, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,171, Cl. D13-4.000.
Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Ichihara, Masuo, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 304,148, 10-24-89, Cl. D7-351.000.

Mizuma, Kensuke: *See—*
Kubo, Masayoshi; Kido, Katsutoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 304,150, Cl. D7-351.000.
Moe, Dennis. Toy construction link. 304,212, 10-24-89, Cl. D21-108.000.
Mohri, Akinari: *See—*
Niitsu, Takuya; and Mohri, Akinari, 304,201, Cl. D16-202.000.
Moritani, Hiroshi, to Sharp Kabushiki Kaisha. Air conditioner. 304,228, 10-24-89, Cl. D23-353.000.
Mosley, Keith A. Necktie clasp. 304,165, 10-24-89, Cl. D11-202.000.
Motorola, Inc.: *See—*
Nagele, Albert L.; and Soren, Leonid, 304,189, Cl. D14-147.000.
Mourad, Miza, to AVIA Group International, Inc. Shoe upper. 304,127, 10-24-89, Cl. D2-314.000.
Muglialdo, Giuseppe: *See—*
Frassati, Guido; Muglialdo, Giuseppe; and Valvassori, Riccardo, 304,173, Cl. D13-13.000.
Muskatello, James: *See—*
Ramsey, Maynard, III; Muskatello, James; Burton, Arthur; Alexander, Kenneth; and George, John, 304,233, Cl. D24-21.000.
Nagele, Albert L.; and Soren, Leonid, to Motorola, Inc. Housing for portable handset telephone or similar artical. 304,189, 10-24-89, Cl. D14-147.000.
Nakajima, Naomi: *See—*
Takada, Kazuo; Ogata, Yayoi; and Nakajima, Naomi, 304,147, Cl. D7-350.000.
NCR Corporation: *See—*
Kato, Shuzo; Sakama, Satoru; and Takahashi, Tamihei, 304,203, Cl. D18-13.000.
NEC Corporation: *See—*
Hayasaka, Sigeki; and Takahashi, Mamoru, 304,192, Cl. D14-191.000.
Niitsu, Takuya; and Mohri, Akinari, to Sony Corporation. Case for video camera combined with video tape recorder. 304,201, 10-24-89, Cl. D16-202.000.
Niitsu, Takuya, to Sony Corporation. Case for video camera combined with video tape recorder. 304,202, 10-24-89, Cl. D16-204.000.
Nishikawa, Hideo; Okamoto, Kenzo; and Kitada, Fumihiko, to Imanishi Kinzoku Kogyo Kabushiki Kaisha. Microwave oven. 304,149, 10-24-89, Cl. D7-351.000.
Nomizu, Hidekatsu, to Twin Bird Industrial Company, Limited. Talking clock. 304,161, 10-24-89, Cl. D10-21.000.
Normark Corporation: *See—*
Reichow, James R., 304,153, Cl. D8-93.000.
Nyberg, Michael J.: *See—*
Kolman, Kenneth R.; Nyberg, Michael J.; Cote, Richard W.; Fuerst, Rory W.; and Granville, James, 304,128, Cl. D2-314.000.
Ogata, Yayoi: *See—*
Takada, Kazuo; Ogata, Yayoi; and Nakajima, Naomi, 304,147, Cl. D7-350.000.
Okamoto, Kenzo: *See—*
Nishikawa, Hideo; Okamoto, Kenzo; and Kitada, Fumihiko, 304,149, Cl. D7-351.000.
Osterhout, Ralph F., to Tekna. Foldable knife. 304,154, 10-24-89, Cl. D8-99.000.
Palau, Margaret. Bandage. 304,238, 10-24-89, Cl. D24-49.000.
Pangborn Corporation, Inc.: *See—*
Carpenter, James H., 304,199, Cl. D15-126.000.
Peterson, Michael: *See—*
Handler, Milton E.; and Peterson, Michael, 304,137, Cl. D6-569.000.
Philips Home Products: *See—*
Purkapile, Emerson J., 304,251, Cl. D32-21.000.
Poulsen, Ole V., to Interlego A.G. Wheel suspension unit for a toy vehicle. 304,221, 10-24-89, Cl. D21-141.000.
Poulson, Keith L.: *See—*
Giese, Robert C.; and Poulson, Keith L., 304,236, Cl. D24-38.000.
Precisioncraft Limited: *See—*
Sawatsky, Henry; Sawatsky, Richard K.; and Sawatsky, David P., 304,206, Cl. D19-86.000.
Puente, Ben A., Jr. Covered sliding glass door handle. 304,156, 10-24-89, Cl. D8-314.000.
Purkapile, Emerson J., to Philips Home Products. Dual vacuum cleaner design. 304,251, 10-24-89, Cl. D32-21.000.
Pyyvaara, Tim T.: *See—*
Benfield, Bruce V.; Benfield, Peter J.; Pyyvaara, Tim T.; Bishop, Victor L.; and Speck, Stuart L., 304,227, Cl. D23-344.000.
Quaker Oats Company, The: *See—*
Taylor, Steven, 304,219, Cl. D21-116.000.
Ramsey, Maynard, III; Muskatello, James; Burton, Arthur; Alexander, Kenneth; and George, John, to Critikon, Inc. Housing for an automated blood pressure and other vital signs monitoring device. 304,233, 10-24-89, Cl. D24-21.000.
Ratcliff, Keith: *See—*
Green, David T.; and Ratcliff, Keith, 304,234, Cl. D24-27.000.
Reichow, James R., to Normark Corporation. Hand held knife sharpener. 304,153, 10-24-89, Cl. D8-93.000.
Rezek, Ron, to Beverly Hills Trading Company, Inc. Ceiling fan. 304,229, 10-24-89, Cl. D23-377.000.
Ricoh Company, Ltd.: *See—*
Kojima, Fumiyo, 304,186, Cl. D14-118.000.
Watanabe, Hiroaki, 304,184, Cl. D14-118.000.
Ridley, Clay K.: *See—*
Christian, Kristy L.; Ridley, Fred A., Jr.; and Ridley, Clay K., 304,126, Cl. D2-293.000.
Ridley, Fred A., Jr.: *See—*
Christian, Kristy L.; Ridley, Fred A., Jr.; and Ridley, Clay K., 304,126, Cl. D2-293.000.
Ritvik Group Inc., The: *See—*
Bertrand, Vic, 304,220, Cl. D21-141.000.
Rochte, Randall S. Geometric ornament. 304,164, 10-24-89, Cl. D11-131.000.
Rose, Martin S., to GEC Plessey Telecommunications Ltd. Debit card public pay telephone stand. 304,190, 10-24-89, Cl. D14-142.000.
Ross, Robert M., Jr.; and McNally, Robert J., to Great Western Trading Corp. Aquarium. 304,246, 10-24-89, Cl. D30-102.000.
Ross, Robert M., Jr.; and McNally, Robert J., to Great Western Trading Corp. Aquarium. 304,247, 10-24-89, Cl. D30-102.000.
Ruger, William B.; and Larson, Lawrence L., to Sturm, Ruger & Company, Inc. Rifle stock with inserts. 304,223, 10-24-89, Cl. D22-108.000.
Russell, Richard H.; and Kaiser, David W., to Eastern Company, The. Flush mounted latch assembly. 304,155, 10-24-89, Cl. D8-303.000.
S.A.M.E.S. S.p.A.: *See—*
Frassati, Guido; Muglialdo, Giuseppe; and Valvassori, Riccardo, 304,173, Cl. D13-13.000.
Sadler, Jeffery G.: *See—*
Tuggle, Lloyd H.; and Sadler, Jeffery G., 304,196, Cl. D15-1.000.
Saigo, Masashi: *See—*
Kamei, Taketo; and Saigo, Masashi, 304,241, Cl. D26-3.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, to Sharp Kabushiki Kaisha. Input/output terminal. 304,175, 10-24-89, Cl. D14-100.000.
Sakama, Satoru: *See—*
Kato, Shuzo; Sakama, Satoru; and Takahashi, Tamihei, 304,203, Cl. D18-13.000.
Sanyo Electric Co., Ltd.: *See—*
Takada, Kazuo; Ogata, Yayoi; and Nakajima, Naomi, 304,147, Cl. D7-350.000.
Sato, Hajime: *See—*
Hoshino, Michio; Ikegami, Masakazu; and Sato, Hajime, 304,169, Cl. D13-1.000.
Savings Spot, Ltd., The: *See—*
Wistrand, John C., 304,207, Cl. D20-2.000.
Sawatsky, David P.: *See—*
Sawatsky, Henry; Sawatsky, Richard K.; and Sawatsky, David P., 304,206, Cl. D19-86.000.
Sawatsky, Henry; Sawatsky, Richard K.; and Sawatsky, David P., to Precisioncraft Limited. Memo tray. 304,206, 10-24-89, Cl. D19-86.000.
Sawatsky, Richard K.: *See—*
Sawatsky, Henry; Sawatsky, Richard K.; and Sawatsky, David P., 304,206, Cl. D19-86.000.
Seikosha Co., Ltd.: *See—*
Aizawa, Junichi; Kumazawa, Shoichiro; Yamauchi, Satoru; and Kondo, Isao, 304,163, Cl. D10-116.000.
Seki, Yuichi: *See—*
Wada, Eiko; and Seki, Yuichi, 304,204, Cl. D18-37.000.
Sekine, Isamu, to Kokusai Denki Kabushiki Kaisha. Radio paging receiver. 304,191, 10-24-89, Cl. D14-192.000.
Severini, John J. Plastic bag dispenser. 304,136, 10-24-89, Cl. D6-515.000.
Sharp Kabushiki Kaisha: *See—*
Moritani, Hiroshi, 304,228, Cl. D23-353.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, 304,175, Cl. D14-100.000.
Simpson-Lawrence Limited: *See—*
Lyall, Gordon M.; and McCarron, Philip F., 304,254, Cl. D34-33.000.
Skalka, Gerald P., to Victor Stanley, Inc. Trash can holder. 304,253, 10-24-89, Cl. D34-6.000.
Small, Mark S.: *See—*
Cranston, William V., III; Martin, Randall W.; Small, Mark S.; and Young, Mark A., 304,178, Cl. D14-109.000.
Smith Kline & French Laboratories, Ltd.: *See—*
Tovey, Geoffrey D., 304,244, Cl. D28-2.000.
Sogabe, Takashi; and Takeyama, Kunio, to Sony Corporation. Storage battery. 304,172, 10-24-89, Cl. D13-8.000.
Song, Chang J. Attachable key light. 304,130, 10-24-89, Cl. D3-63.000.
Sony Corporation: *See—*
Niitsu, Takuya; and Mohri, Akinari, 304,201, Cl. D16-202.000.
Niitsu, Takuya, 304,202, Cl. D16-204.000.
Sogabe, Takashi; and Takeyama, Kunio, 304,172, Cl. D13-8.000.
Soren, Leonid: *See—*
Nagele, Albert L.; and Soren, Leonid, 304,189, Cl. D14-147.000.
Speck, Stuart L.: *See—*
Benfield, Bruce V.; Benfield, Peter J.; Pyyvaara, Tim T.; Bishop, Victor L.; and Speck, Stuart L., 304,227, Cl. D23-344.000.
Stanley Works, The: *See—*
Kmetz, David G., 304,152, Cl. D8-68.000.
Stock, Michael H.: *See—*
Fuller, Thomas G.; Stock, Michael H.; and Weckel, Hoawrd F., III, 304,194, Cl. D14-257.000.
Strater, Fritz. Table-mounted adjustable lamp. 304,242, 10-24-89, Cl. D26-65.000.
Stream, Robert D., to Teledyne Industries, Inc. Subgingival delivery tip for attachment to dental irrigation instruments. 304,231, 10-24-89, Cl. D24-15.000.
Sturm, Ruger & Company, Inc.: *See—*
Ruger, William B.; and Larson, Lawrence L., 304,223, Cl. D22-108.000.

Sugiyama, Yoshihiko: *See*—
Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishiro, Benito, 304,181, Cl. D14-116.000.
Sutoh, Shigeru, to Kabushiki Kaisha Toshiba. Portable handset radio telephone. 304,188, 10-24-89, Cl. D14-138.000.
Takada, Kazuo; Ogata, Yayoi; and Nakajima, Naomi, to Sanyo Electric Co., Ltd. Electric oven toaster. 304,147, 10-24-89, Cl. D7-350.000.
Takahashi, Mamoru: *See*—
Hayasaka, Sigeki; and Takahashi, Mamoru, 304,192, Cl. D14-191.000.
Takahashi, Masaki, to Canon Kabushiki Kaisha. Facsimile. 304,182, 10-24-89, Cl. D14-118.000.
Takahashi, Tamihei: *See*—
Kato, Shuzo; Sakama, Satoru; and Takahashi, Tamihei, 304,203, Cl. D18-13.000.
Takeyama, Kunio: *See*—
Sogabe, Takashi; and Takeyama, Kunio, 304,172, Cl. D13-8.000.
Tanigami, Shintaro, to Elm Industry Co., Ltd. Envelope opener. 304,131, 10-24-89, Cl. D3-72.000.
Tapdrup, Erik P., to Interiego A.G. Body element for a toy aircraft. 304,211, 10-24-89, Cl. D21-91.000.
Tata, Hideaki: *See*—
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,170, Cl. D13-4.000.
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 304,171, Cl. D13-4.000.
Taylor, Steven, to Quaker Oats Company, The. Toy barn. 304,219, 10-24-89, Cl. D21-116.000.
Technical Tools, Inc.: *See*—
MacKelvie, Philip A., 304,200, Cl. D15-140.000.
Tekna: *See*—
Osterhout, Ralph F., 304,154, Cl. D8-99.000.
Teledyne Industries, Inc.: *See*—
Stream, Robert D., 304,231, Cl. D24-15.000.
Thorpe, Vonda J. Holder for floss and similar articles. 304,129, 10-24-89, Cl. D3-23.000.
Tovey, Geoffrey D., to Smith Kline & French Laboratories, Ltd. Pharmaceutical tablet. 304,244, 10-24-89, Cl. D28-2.000.
Trucker's Comfort Systems, Inc.: *See*—
Giles, William E.; and Kapp, Joseph P., 304,174, Cl. D13-31.000.
Tuggle, Lloyd H.; and Sadler, Jeffery G., to White Consolidated Industries, Inc. Power head for a vegetation cutter. 304,196, 10-24-89, Cl. D15-1.000.
Twin Bird Industrial Company, Limited: *See*—
Nomizu, Hidekatsu, 304,161, Cl. D10-21.000.
United States Surgical Corporation: *See*—
Green, David T.; and Ratcliff, Keith, 304,234, Cl. D24-27.000.
Valvassori, Riccardo: *See*—
Frassati, Guido; Muglialdo, Giuseppe; and Valvassori, Riccardo, 304,173, Cl. D13-13.000.
Victor Stanley, Inc.: *See*—
Skalka, Gerald P., 304,253, Cl. D34-6.000.
Vitello, Jonathan J.: *See*—
Beaton, Larry G.; McClain, Kevin T.; Vitello, Jonathan J.; Wetzel, Timothy D.; and Williams, Roger C., 304,179, Cl. D14-113.000.
Wada, Eiko; and Seki, Yuichi, to Canon Kabushiki Kaisha. Copying machine. 304,204, 10-24-89, Cl. D18-37.000.
Wang, Tim. Ceramic heating element. 304,230, 10-24-89, Cl. D23-386.000.
Watanabe, Hiroaki, to Ricoh Company, Ltd. Facsimile transmitter/-receiver. 304,184, 10-24-89, Cl. D14-118.000.
Weckel, Hoawrd F., III: *See*—
Fuller, Thomas G.; Stock, Michael H.; and Weckel, Hoawrd F., III, 304,194, Cl. D14-257.000.
Weernink, Johannes H., to Mepal B.V. Sugar pot. 304,138, 10-24-89, Cl. D7-17.000.
Weernink, Johannes H., to MEPAL B.V. Milk can. 304,146, 10-24-89, Cl. D7-317.000.
Wetzel, Timothy D.: *See*—
Beaton, Larry G.; McClain, Kevin T.; Vitello, Jonathan J.; Wetzel, Timothy D.; and Williams, Roger C., 304,179, Cl. D14-113.000.
White Consolidated Industries, Inc.: *See*—
Tuggle, Lloyd H.; and Sadler, Jeffery G., 304,196, Cl. D15-1.000.
Williams, Roger C.: *See*—
Beaton, Larry G.; McClain, Kevin T.; Vitello, Jonathan J.; Wetzel, Timothy D.; and Williams, Roger C., 304,179, Cl. D14-113.000.
Williamsen, Mark S.: *See*—
Wilson, Dennis A.; Anesi, Dennis W.; and Williamsen, Mark S., 304,224, Cl. D23-245.000.
Wilson, Dennis A.; Anesi, Dennis W.; and Williamsen, Mark S., to Ansan Industries Ltd. Flow control valve for lawn sprinkler. 304,224, 10-24-89, Cl. D23-245.000.
Wistrand, John C., to Savings Spot, Ltd., The. Coupon dispensing terminal. 304,207, 10-24-89, Cl. D20-2.000.
Wright, Robert L., to Creative Athletic Products and Services, Inc. Batting cage. 304,240, 10-24-89, Cl. D25-1.000.
Yamauchi, Satoru: *See*—
Aizawa, Junichi; Kumazawa, Shoichiro; Yamauchi, Satoru; and Kondo, Isao, 304,163, Cl. D10-116.000.
Yoshihara, Tsutomu, to Canon Kabushiki Kaisha. Facsimile. 304,185, 10-24-89, Cl. D14-118.000.
Young, Mark A.: *See*—
Cranston, William V., III; Martin, Randall W.; Small, Mark S.; and Young, Mark A., 304,178, Cl. D14-109.000.
Yuen, John S., to John Manufacturing Limited. Vacuum cleaner with adjustable handle. 304,249, 10-24-89, Cl. D32-18.000.
Zwald, John J., to GTE Products Corporation. Fluorescent lamp with simulative gaslight cover. 304,243, 10-24-89, Cl. D26-4.000.

LIST OF PLANT PATENTEES

Bradford, Lowell G.: *See*—
Bradford, Norman G.; and Bradford, Lowell G., 7,049, Cl. 41.000.
Bradford, Norman G.; and Bradford, Lowell G., 7,050, Cl. 41.000.
Bradford, Norman G.; and Bradford, Lowell G. Nectarine tree (Summer Bright). 7,049, 10-24-89, Cl. 41.000.
Bradford, Norman G.; and Bradford, Lowell G. Nectarine tree (Diamond Jewel). 7,050, 10-24-89, Cl. 41.000.

CLASSIFICATION OF PATENTS

ISSUED OCTOBER 24, 1989

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

8 4,875,235
67 4,875,236
94 4,875,237
115 4,875,238
152 R 4,875,239
227 4,875,240
409 4,875,241

CLASS 4

243 4,875,242
662 4,875,243

CLASS 5

37 R 4,875,244
482 4,875,245

CLASS 8

94.27 4,875,900
111 4,876,046
115.56 4,875,901
406 4,875,902
640 4,875,903

CLASS 15

98 4,875,246
104.94 4,875,247
143 R 4,875,248
398 4,875,249

CLASS 16

4 4,875,250
111 R 4,875,251
288 4,875,252

CLASS 17

1 E 4,875,253
61 4,875,254
64 4,875,255

CLASS 19

159 A 4,875,256

CLASS 24

90 B 4,875,257
389 4,875,258
576 4,875,259

CLASS 26

81 4,875,260

CLASS 29

116.1 4,875,261
121.8 4,875,262
149.5 S 4,875,263
163.6 4,875,264
240 4,875,265
263 4,875,266
281.3 4,875,267
283 4,875,268
401.1 4,875,269
421.1 4,875,270
432 4,875,271
451 4,875,272
467 4,875,273
525.1 4,875,274
568 4,875,275
603 4,875,276
606 4,875,277
622 4,875,278
740 4,875,279
783 4,875,280
825 4,875,281
830 4,875,282
4,875,283
4,875,284
832 4,875,285
872 4,875,286

CLASS 30

34.01 4,875,287
49 4,875,288
167 4,875,289
198 4,876,472

CLASS 33

265 4,875,290
293 4,875,291
304 4,875,292
508 4,875,293
539 4,875,294
720 4,875,295
770 4,875,296

CLASS 34

48 4,875,297
67 4,875,904
86 4,875,298

CLASS 36

117 4,875,299
134 4,875,300

CLASS 38

14 4,875,301

CLASS 40

610 4,875,302

CLASS 42

90 4,875,303

CLASS 43

25 4,875,304
42.06 4,875,305

CLASS 44

589 4,875,905

CLASS 48

197 R 4,875,906

CLASS 49

208 4,875,306
374 4,875,307
501 4,875,308

CLASS 51

293 4,875,907
419 4,875,309

CLASS 52

81 4,875,310
90 4,875,311
144 4,875,312
167 DF 4,875,313
167 R 4,875,314
189 4,875,315
204 4,875,316
208 4,875,317
211 4,875,318
383 4,875,319
406 4,875,320
553 4,875,321
746 4,875,322

CLASS 53

48 4,875,323
88 4,875,324
137 4,875,325
435 4,875,326
475 4,875,327
529 4,875,328
559 4,875,329

CLASS 55

16 4,875,908
40 4,875,909
74 4,875,910
162 4,875,911
279 4,875,912
294 4,875,913
389 4,875,914

CLASS 56

41 4,875,330
208 4,875,331
377 4,875,332

CLASS 57

125 4,875,333
406 4,875,334

CLASS 60

274 4,875,335
286 4,875,336
421 4,875,337
550 4,875,338
635 Re.33,098
757 4,875,339

CLASS 62

4 4,875,915
50.2 4,875,340
115 4,875,341
4,875,342
381 4,875,343
4,875,344
402 4,875,345
467 4,875,346

CLASS 65

2 4,875,916
3.11 4,875,917
3.12 4,875,918
27 4,875,919
30.14 4,875,920

CLASS 66

219 4,875,347

CLASS 68

200 4,875,348

CLASS 70

95 4,875,349
241 4,875,350
271 4,875,351
395 4,875,352

CLASS 71

7 4,875,921
76 4,875,922
90 4,876,044
92 4,875,923
4,875,924
4,875,928
94 4,875,925
4,875,926
4,875,927
106 4,875,930
121 4,875,929

CLASS 72

133 4,875,353
180 4,875,354
306 4,875,355
321 4,875,356
405 4,875,931
453.12 B1 4,607,518

CLASS 73

27 A 4,875,357
40 4,875,358
4,875,359
40.7 4,875,360
49.2 4,875,361
54 4,875,362
56 4,875,363
61.1 R 4,875,364
104 4,875,365
118.1 4,875,366
4,875,367
151 4,875,368
4,875,369
202 4,875,932
309 4,875,370
598 4,875,371
614 4,875,372
655 4,875,373
663 4,875,374
795 4,875,375
852 4,875,376
861.02 4,875,377
862.04 4,875,378
862.34 4,875,379
864.58 4,875,380
866.3 4,875,381

CLASS 74

84 R 4,875,382
473 R 4,875,383
500.5 4,875,384
512 4,875,385
551.9 4,875,386
552 4,875,387
579 R 4,875,388
689 4,875,389
731 4,875,390
866 4,875,391
867 4,875,392

CLASS 75

10.17 4,875,933
58 4,875,934
117 4,875,935

CLASS 76

27 4,875,393

CLASS 81

3.08 4,875,394
13 4,875,395

CLASS 82

60 4,875,397
124 4,875,396

CLASS 83

100 4,875,398
468.3 4,875,399

CLASS 84

384 4,875,401
626 4,875,400

CLASS 89

43.01 4,875,402

CLASS 91

482 4,875,403

CLASS 92

130 A 4,875,404
194 4,875,405

CLASS 98

2.01 4,875,406

CLASS 99

283 4,875,408
451 4,875,407

CLASS 101

93.29 4,875,409
170 4,875,410
218 4,875,936
333 4,875,411
425 4,875,412

CLASS 102

307 4,875,413
4,875,414

CLASS 104

35 4,875,415
167 4,875,416

CLASS 105

248 4,875,417

CLASS 106

23 B1 4,246,033
35 Re.33,100
104 4,875,937
120 4,875,938

CLASS 108

50 4,875,418
56.1 4,875,419

CLASS 110

215 4,875,420

CLASS 111

200 4,875,421

CLASS 112

258 4,875,422
438 4,875,423

CLASS 114

39.2 4,875,424
56 4,875,425
123 4,875,426
219 4,875,427
255 4,875,428
331 4,875,429
355 4,875,430

CLASS 116

173 4,875,431
223 4,875,432
335 4,875,433

CLASS 118

52 4,875,434
62 4,875,435

CLASS 122

7 R 4,875,436

CLASS 123

52 MB 4,875,438
81 B 4,875,440
90.13 4,875,441
90.39 4,875,442
179 G 4,875,443
270 4,875,444
271 4,875,939
292 4,875,445
339 4,875,446
4,875,447
352 4,875,448
400 4,875,449
411 4,875,437
425 4,875,450
435 4,875,451
440 4,875,453
488 4,875,452
541 4,875,439
559.3 4,875,454
568 4,875,455
585 4,875,456
633 4,875,457

CLASS 124

35 A 4,875,458
49 4,875,459

CLASS 125

11 DF 4,875,460
23 R 4,875,461

CLASS 126

29 4,875,462
80 4,875,463
92 R 4,875,464
391 4,875,465
415 4,875,466
424 4,875,467

CLASS 127

2 4,875,940

CLASS 128

3 4,875,468
26 4,875,469
57 4,875,470
69 4,875,471
79 4,875,472
92 Y 4,875,474
155 4,875,473
157 4,875,476
206.21 4,875,477
303 B 4,875,478
335.5 4,875,479
343 4,875,480
344 4,875,481
352 4,875,482
419 PG 4,875,483
421 4,875,484
653 4,875,485
4,875,486
660.03 4,875,487
694 4,875,488
772 4,875,489
830 4,875,490
844 4,875,491
890 4,875,492
924 Y 4,875,475

CLASS 131

84.1 4,875,493
4,875,494
110 4,875,495

CLASS 132

329 4,875,496

CLASS 134

11 4,875,941
15 4,875,942

CLASS 136

244 4,875,943
249 4,875,944

CLASS 137

2 4,875,497
78.3 4,875,498
82 4,875,499
596.18 4,875,500
625.64 4,875,501
627.5 4,875,502
856 4,875,503
899 4,875,504

CLASS 139

448 4,875,505
450 4,875,506
4,875,507

CLASS 141

2 4,875,508
38 4,875,509

CLASS 144

145 A 4,875,510
208 R 4,875,511
246 E 4,875,512
286 R 4,875,513
367 4,875,514

CLASS 148

103 4,875,946
113 4,875,947

CLASS 149

15 4,875,948
19.3 4,875,949
21 4,875,950
109.6 4,875,951

CLASS 152

210 4,875,515

CLASS 156

48 4,875,952
62 4,875,953
64 4,875,954
4,875,955
84 4,875,956
85 4,875,957
108 4,875,958
123 4,875,959
203 4,875,960
234 4,875,961
245 4,875,962
249 4,875,963
327 4,875,964
442.1 4,875,965
580 4,875,966
605 4,875,967
633 4,875,968
4,875,969
644 4,875,971
645 4,875,970
664 4,875,972
4,875,973

CLASS 160

178.1 4,875,516

CLASS 162

10 4,875,974
273 4,875,975
300 4,875,977
306 4,875,976

CLASS 164

34 4,875,517
119 4,875,518
465 4,875,519

CLASS 165

10 4,875,520
39 4,875,521
104.14 4,875,522

CLASS 166

77 4,875,523
241 4,875,524
280 4,875,525

CLASS 169

24 4,875,526

CLASS 172

248 4,875,527

CLASS 173

12 4,875,528
163 4,875,529

CLASS 174

15.4 4,876,413
81 4,876,414

CLASS 175

27 4,875,530
250 4,875,531
371 4,875,532

CLASS 177

144 4,875,533
212 4,875,534

CLASS 180

6.2 4,875,535
6.32 4,875,536
69.1 4,875,537
79.1 4,875,539
4,875,540
4,875,541
142 4,875,542
219 4,875,543
233 4,875,698
248 4,875,978
379 4,875,538

CLASS 181

113 4,875,544
115 4,875,545
160 4,875,546

CLASS 182

102 4,875,547
137 4,875,548
138 4,875,549
221 4,875,550

CLASS 184

6.3 4,875,551

CLASS 187

1 R 4,875,552
4,875,553
9 R 4,875,555
124 4,875,554

CLASS 188

72.4 4,875,556
79.55 4,875,557
171 4,875,558
203 4,875,559
319 4,875,560

CLASS 192

0.033 4,875,561
3.28 4,875,562
4 A 4,875,563
45.1 4,875,564
48.2 4,875,565
53 F 4,875,566

CLASS 194

318 4,875,567

CLASS 198

36 D 4,875,569
335 4,875,568
408 4,875,570
431 4,875,571
744 4,875,572
831 4,875,573

CLASS 200

5 A 4,876,415
11 R 4,876,416
43.16 4,876,425
48 V 4,876,417
50 C 4,876,418
86 R 4,876,419
4,876,420
144 C 4,876,421
302.1 4,876,422
306 4,876,424

CLASS 201

5 4,875,979

CLASS 203

14 4,875,980

CLASS 204

1 T 4,875,981
14 4,875,982
28 4,875,983
56.1 4,875,984
64 T 4,875,985
157.6 4,875,986
192.15 4,875,987
265 4,875,988
298 4,875,989
408 4,875,990

CLASS 206

0.5 4,875,574
4,875,575
219 4,875,576
4,875,577
309 4,875,578
315.1 4,875,579
319 4,875,580
328 4,875,581
330 4,875,582
365 4,875,583
387 4,875,584
426 4,875,585
427 4,875,586
484 4,875,587

CLASS 208

59 4,875,991
89 4,875,992
113 4,875,993
4,875,994
152 4,875,995
157 4,875,996
235 4,875,997
390 4,875,998

CLASS 209

3.3 4,875,588
211 B1 3,415,374
245 4,875,999
534 4,875,589
584 4,876,000

CLASS 210

123 4,876,001
136 4,876,002
169 4,876,003
170 4,876,004
198.2 4,876,005
321.69 4,876,006
339 4,876,007
498 4,876,008
500.33 4,876,009
525 4,876,010
526 4,876,011
644 4,876,012
650 4,876,013
668 4,876,014
695 4,876,015
739 4,876,016

CLASS 211

55 4,875,590
69.1 4,875,591
88 4,875,592
95 4,875,593

CLASS 215

252 4,875,594

CLASS 219

10.55 A 4,876,426
10.55 E 4,876,423
4,876,427
4,876,428
69.15 4,876,429
110 4,876,430
4,876,431
124.32 4,876,432
130.51 4,876,433
215 4,876,434
364 4,876,435
370 4,876,436
388 4,876,437
497 4,876,438
541 4,876,439
548 4,876,440

CLASS 220

1.5 4,875,595
403 4,875,596
458 4,875,597

CLASS 221

4 4,875,598
231 4,875,599

CLASS 222

52 4,875,600
145 4,875,601
187 4,875,602
205 4,875,603
257 4,875,604
402.24 4,875,605
600 4,875,606
643 4,875,607

CLASS 224

42.03 B 4,875,608

CLASS 225

13 4,875,609

CLASS 226

10 4,875,610
186 4,875,611

CLASS 227

147 4,875,612

CLASS 228

5.5 4,875,614
44.3 4,875,613
119 4,875,615
120 4,875,616
123 4,875,617
179 4,875,618
190 4,875,619

CLASS 229

1.5 B 4,875,620

CLASS 232

34 4,875,621
39 4,875,622

CLASS 235

488 4,876,441

CLASS 236

12.12 4,875,623
49.5 4,875,624

CLASS 239

124 4,875,625
314 4,875,626
466 4,875,627

CLASS 241

24 4,875,628
39 4,875,629
56 4,875,630
92 4,875,631

CLASS 242

56.2 4,875,632
58.3 4,875,633
67.3 R 4,875,634
4,875,635
68.6 4,875,636
71.1 4,875,637
4,875,638
198 4,875,640
199 4,875,641
309 4,875,639

CLASS 244

13 4,875,642
53 A 4,875,643
134 R 4,875,644
137.1 4,875,645
190 4,875,646

CLASS 248

74.3 4,875,647
125 4,875,648
153 4,875,649
261 4,875,650
286 4,875,651
311.2 4,875,652
332 4,875,653
467 4,875,654
557 4,875,655
642 4,875,656

CLASS 249

86 4,875,657

CLASS 250

205 4,876,442
211 R 4,876,443
214 AL 4,876,444
221 4,876,445
4,876,446
227 4,876,447
234 4,876,448
259 4,876,449
261 4,876,450
327.2 4,876,452
332 4,876,453
370.14 4,876,454
560 4,876,455
561 4,876,456
563 4,876,457
574 4,876,458

CLASS 251

282 4,875,659

CLASS 252

8.51 4,876,017
8.551 4,876,018
32.5 4,876,019
40.5 4,876,020
48.2 4,876,021
62.56 4,876,022
90 4,876,023
174.12 4,876,024
182.32 4,876,025
299.61 4,876,026
4,876,028
299.65 4,876,027
301.17 4,876,029
315.2 4,876,030
373 4,876,031
500 4,876,032
511 4,876,033
546 4,876,034
550 4,876,035
637 4,876,036

CLASS 254

1 4,875,660
134.3 FT 4,875,661

CLASS 260

397.3 4,876,045
543 R 4,876,048

CLASS 261

113 4,876,037
152 4,876,038

CLASS 264

4.7 4,876,039
14 4,876,040
25 4,876,041
39 4,876,042
4,876,043
49 4,876,049
71 Re.33,101
102 4,876,050
127 4,876,051
148 4,876,052
255 4,876,053
333 4,876,054
512 4,876,055

CLASS 266

44 4,875,662
272 4,875,663

CLASS 267

140.1 4,875,664
170 4,875,665

CLASS 269

37 4,875,666
91 4,875,667

CLASS 270

45 4,875,668
54 4,875,669

CLASS 271

265 4,875,670
302 4,875,671

CLASS 272

33 R 4,875,672
71 4,875,673
72 4,875,674
74 4,875,675
123 4,875,676

CLASS 273

26 C 4,875,677
30 4,875,678
73 R 4,875,679
87 B 4,875,680
155 4,875,681
176 F 4,875,682
187 B 4,875,683
195 B 4,875,684
4,875,685
237 4,875,686
241 4,875,687
285 4,875,688
346 4,875,689

CLASS 277

12 4,875,690
147 4,875,691
212 FB 4,875,692

CLASS 279

2 R 4,875,693

CLASS 280

32.6 4,875,694
33.993 4,875,695
47.34 4,875,696
95.1 4,875,697
236 4,875,699
414.1 4,875,700
4,875,701
602 4,875,702
665 4,875,703
695 4,875,704
697 4,875,705
708 4,875,706

CLASS 281

30 4,875,707
45 4,875,708

CLASS 285

14 4,875,709
24 4,875,710
45 4,875,711
47 4,875,712
55 4,875,713
86 4,875,714
87 4,875,715
137.1 4,875,716
149 4,875,717
175 4,875,718
239 4,875,719
249 4,875,720

CLASS 292

29 4,875,721
92 4,875,722
201 4,875,723
216 4,875,724
244 4,875,725
337 4,875,726
4,875,727

CLASS 293

126 4,875,728

CLASS 294

1.3 4,875,729

CLASS 296

37.2 4,875,731
37.5 4,875,730
195 4,875,733

CLASS 297

181 4,875,732
284 4,875,734
367 4,875,735
440 4,875,736
442 4,875,737

CLASS 299

80 4,875,738

CLASS 303

33 4,875,739
50 4,875,740
116 4,875,741
119 4,875,742

CLASS 307

11 4,876,459
64 4,876,460
116 4,876,461
246 4,876,462
265 4,876,463
353 4,876,464
443 4,876,465
465 4,876,466
570 4,876,467
643 4,876,468

CLASS 310

52 4,876,469
59 4,876,470
105 4,876,471
216 4,876,473
236 4,876,474
239 4,876,475
320 4,876,476

CLASS 312

13 4,875,743
266 4,875,744
298 4,875,745
330.1 4,875,746
4,875,747

CLASS 313

404 4,876,477
413 4,876,478
440 4,876,479
477 R 4,876,480
502 4,876,481
579 4,876,482
634 4,876,483

CLASS 315

94 4,876,484
244 4,876,485
290 4,876,486
362 4,876,487
378 4,876,488

CLASS 318

17 4,876,490
138 4,876,491
254 4,876,492
293 4,876,493
568.22 4,876,494

CLASS 320

18 4,876,495
31 4,876,496

CLASS 323

211 4,876,497
300 4,876,498
312 4,876,499

CLASS 324

61 R 4,876,500
73 R 4,876,501
115 4,876,502
117 R 4,876,503
204 4,876,504
208 4,876,505
220 4,876,506
307 4,876,507
309 4,876,508
4,876,509
318 4,876,510
338 4,876,511
376 4,876,512
427 4,876,513
538 4,876,515
556 4,876,514

CLASS 330

54 4,876,516
277 4,876,517

CLASS 331

1 A 4,876,518
57 4,876,519

CLASS 333

12 4,876,520

CLASS 335

179 4,876,521
193 4,876,522

CLASS 337

299 4,876,523

CLASS 338

2 4,876,524

CLASS 340

436 4,876,525
441 4,876,527
442 4,876,528
450.3 4,876,529
471 4,876,526
605 4,876,530
686 4,876,531
689 4,876,532
721 4,876,533
825.260 4,876,538
825.340 4,876,535
825.44 4,876,537
825.440 4,876,536
825.950 4,876,534
856 4,876,539
932.2 4,876,540

CLASS 341

51 4,876,541
143 4,876,542
166 4,876,544

CLASS 342

14 4,876,545
15 4,876,546
160 4,876,547
368 4,876,548
383 4,876,489
417 4,876,549
451 4,876,550
460 4,876,551

CLASS 343

702 4,876,552
756 4,876,553
780 4,876,554
895 4,876,555

CLASS 346

108 4,876,556
137 4,876,557
140 R 4,876,558
4,876,559
153.1 4,876,560
159 4,876,561
160 4,876,562

CLASS 350

6.8 4,875,748
96.18 4,875,749
4,875,750
4,875,751
96.2 4,875,752
96.20 4,875,753
4,875,754
4,875,755
4,875,756
96.23 4,875,757
96.30 4,875,758
96.34 4,875,759
102 4,875,760
171 4,875,761
357 4,875,762
432 4,875,763
611 4,875,764
4,875,765
641 4,875,766

CLASS 351

212 4,875,767

CLASS 353

27 A 4,875,768

CLASS 354

234.1 4,876,563
400 4,876,564
403 4,876,565
436 4,876,566

CLASS 355

20 4,876,567
56 4,876,568
68 4,876,569
204 4,876,570
210 4,876,571
4,876,572
250 4,876,573

253 4,876,574
259 4,876,575
285 4,876,576
315 4,876,577
4,876,578

CLASS 356

28 4,875,769
28.5 4,875,770
30 4,875,771
73.1 4,875,772
328 4,875,773
350 4,875,774
4,875,775
372 4,875,776
376 4,875,777
394 4,875,778
4,875,779
446 4,875,780

CLASS 357

22 4,876,579
4,876,580
23.13 4,876,584
23.3 4,876,581
23.5 4,876,582
23.7 4,876,583
24 4,876,585
30 4,876,586
70 4,876,587
81 4,876,588

CLASS 358

22 4,876,589
41 4,876,590
43 4,876,591
56 4,876,721
84 4,876,592
100 4,876,593
103 4,876,594
136 4,876,595
140 4,876,596
141 4,876,597
160 4,876,598
162 4,876,599
183 4,876,600
213.26 4,876,601
227 4,876,602
4,876,603
261.2 4,876,607
400 4,876,604
4,876,605
434 4,876,606
443 4,876,608
4,876,609
4,876,610
456 4,876,611
471 4,876,613
474 4,876,612

CLASS 360

10.2 4,876,614
43 4,876,615
53 4,876,616
60 4,876,617
78.13 4,876,618
97.01 4,876,619
104 4,876,623

CLASS 361

56 4,876,620
58 4,876,621
87 4,876,624
93 4,876,625
94 4,876,622
119 4,876,626
293 4,876,627
313 4,876,628
391 4,876,629
413 4,876,630
502 4,876,631
540 4,876,451

CLASS 362

183 4,876,632
223 4,876,633

CLASS 363

5 4,876,634
17 4,876,635
21 4,876,636
37 4,876,637
97 4,876,638

CLASS 364

200 4,876,639
4,876,640
4,876,641
4,876,642
4,876,643
4,876,644
4,876,645
4,876,646
408 4,876,648
420 4,876,647
424.05 4,876,649
426.02 4,876,650
449 4,876,651
473 4,876,652
479 4,876,653
483 4,876,654
487 4,876,655
491 4,876,656
521 4,876,657
550 4,876,658
717 4,876,659
754 4,876,660
787 4,876,661
900 4,876,662
4,876,663
4,876,664
4,876,665

CLASS 365

106 4,876,666
113 4,876,667
163 4,876,668
189.01 4,876,669
194 4,876,670
233 4,876,671

CLASS 366

130 4,875,781

CLASS 367

35 4,876,672
68 4,876,673
139 4,876,674
155 4,876,675

CLASS 368

63 4,876,676
87 4,876,677

CLASS 369

31 4,876,678
44 4,876,679
110 4,876,680

CLASS 370

60 4,876,681
66 4,876,682
97 4,876,683

CLASS 371

21.2 4,876,684
21.6 4,876,685
49.1 4,876,686

CLASS 372

2 4,876,687
22 4,876,688
38 4,876,689
56 4,876,690
65 4,876,691
70 4,876,692
82 4,876,693
93 4,876,694

CLASS 374

148 4,875,782
170 4,875,783

CLASS 375

3 4,876,695
5 4,876,696
22 4,876,697
25 4,876,698
82 4,876,699
87 4,876,700
106 4,876,701
120 4,876,702

CLASS 376

146 4,875,945
152 4,876,056
216 4,876,057
247 4,876,058
4,876,059
333 4,876,060
353 4,876,061
444 4,876,062
4,876,063

CLASS 377

62 4,876,703
70 4,876,704

CLASS 378

144 4,876,705
174 4,876,706

CLASS 379

57 4,876,707
61 4,876,708
4,876,709
63 4,876,710
94 4,876,711
387 4,876,712
412 4,876,713
433 4,876,714
452 4,876,715

CLASS 380

21 4,876,716
25 4,876,717
42 4,876,718

CLASS 381

1 4,876,719
43 4,876,720
71 4,876,722
182 4,876,723
187 4,876,724

CLASS 382

4 4,876,725
4,876,726
8 4,876,727
21 4,876,728
22 4,876,729
27 4,876,733
37 4,876,730
40 4,876,731
41 4,876,732
54 4,876,734
57 4,876,735

CLASS 384

273 4,875,784
448 4,875,785
482 4,875,786
548 4,875,787

CLASS 4.1

143 4,876,543

CLASS 400

163.1 4,875,788
196.1 4,875,789
605 4,875,790

CLASS 401

176 4,875,791
283 4,875,792

CLASS 402

3 4,875,793

CLASS 403

132 4,875,794
279 4,875,795
359 4,875,796

CLASS 404

9 4,875,797
12 4,875,798
4,875,799
35 4,875,800
48 4,875,801
67 4,875,802

CLASS 405

16 4,875,803
31 4,875,804
128 4,875,805
224 4,875,806
229 4,875,807
244 4,875,808
263 4,875,809

CLASS 406

14 4,875,810
39 4,875,811

CLASS 407

104 4,875,812

CLASS 410

9 4,875,813
66 4,875,814

CLASS 411

38 4,875,815
104 4,875,816
171 4,875,817
369 4,875,818
432 4,875,819

CLASS 414

306 4,875,820
481 4,875,821
563 4,875,822
735 4,875,823
751 4,875,824
786 4,875,825

CLASS 415

89 4,875,826
111 4,875,827
173.4 4,875,828

CLASS 416

2 4,875,829
215 4,875,830
228 4,875,831

CLASS 417

222 4,875,832
259 4,875,833
269 4,875,834
295 4,875,835
360 4,875,836
407 4,875,837

CLASS 418

55 4,875,838
4,875,839
4,875,840
60 4,875,841
220 4,875,842

CLASS 420

422 4,876,064
582 4,876,065

CLASS 422

46 4,876,066
56 4,876,067
58 4,876,068
73 4,876,069
122 4,876,070
133 4,876,071
179 4,876,072

CLASS 423

2 4,876,073
210.5 4,876,074
226 4,876,075
242 4,876,076
447.3 4,876,078
448 4,876,077
578 R 4,876,079
648.1 4,876,080

CLASS 424

1.1 4,876,081
7.1 4,876,082
47 4,876,083
4,876,085
62 4,876,084
80 4,876,086
84 4,876,087
85.8 4,876,088
89 4,876,089
195.1 4,876,090
421 4,876,091
435 4,876,092
438 4,876,093
491 4,876,094

CLASS 425

4 R 4,875,843
131.5 4,875,844
143 4,875,845
186 4,875,846
204 4,875,847
549 4,875,848
589 4,875,849

CLASS 426

3 4,876,095
28 4,876,096
57 4,876,104
74 4,876,097
231 4,876,098
242 4,876,099
491 4,876,100
549 4,876,101
550 4,876,102
573 4,876,105
574 4,876,103
583 4,876,106
601 4,876,107
650 4,876,108

CLASS 427

2 4,876,109
4,876,110
31 4,876,111
38 4,876,112
39 4,876,113
45.1 4,876,114
115 4,876,115
118 4,876,116
130 4,876,117
142 4,876,118
250 4,876,119

CLASS 428

1 4,876,120
15 4,876,121
34.1 4,876,122
34.2 4,876,123
34.5 4,876,124
35.2 4,876,125
35.7 4,876,126
4,876,127
40 4,876,130
42 4,876,131
43 4,876,132
64 4,876,133
73 4,876,134
74 4,876,135
80 B1 4,588,627
102 4,876,128
130 4,876,136
141 4,876,137
172 4,876,138
196 B1 4,510,193
200 4,876,139
216 4,876,140
217 4,876,141
224 4,876,142
294 4,876,143
327 4,876,145
336 4,876,144
347 4,876,146
359 4,876,129
379 4,876,147
384 4,876,148
411.1 4,876,150
425.9 4,876,149
446 4,876,151
447 4,876,152
4,876,153
4,876,154
480 4,876,155
516 4,876,156
542.8 4,876,157
565 4,876,158
607 4,876,159
623 4,876,160
691 4,876,161

CLASS 429

13 4,876,162
30 4,876,163

CLASS 430

5 4,876,164
7 4,876,165
4,876,166
4,876,167
58 4,876,168
110 4,876,169
138 4,876,170
203 4,876,171
253 4,876,172
271 4,876,173
281 4,876,175
311 4,876,176
313 4,876,177
314 4,876,178
320 4,876,179
380 4,876,174
393 4,876,180
522 4,876,181
555 4,876,182
567 4,876,183
580 4,876,185
607 4,876,184

CLASS 431

6 4,875,851
8 4,875,850
324 4,875,852

CLASS 432

100 4,875,853
120 4,875,854

CLASS 433

3 4,875,855
18 4,875,856
56 4,875,857
222.1 Re.33,099
226 4,875,858

CLASS 434

214 4,875,859

CLASS 435

6 4,876,186
4,876,187
7 4,876,188
4,876,189
4,876,190
4,876,191
21 4,876,192
29 4,876,193
68 4,876,194
137 4,876,195
161 4,876,196
172.3 4,876,197
183 4,876,198
253.3 4,876,200
262 4,876,201
320 4,876,202

CLASS 436

45 4,876,203
46 4,876,204
66 4,876,205
82 4,876,206
135 4,876,207
531 4,876,208

CLASS 437

5 4,876,209
4,876,210
22 4,876,211
34 4,876,212
4,876,213
60 4,876,215
67 4,876,216
4,876,217
4,876,214
4,876,218
126 4,876,219
170 4,876,220
212 4,876,221
225 4,876,222
228 4,876,223
4,876,224
248 4,876,225

CLASS 439

15 4,875,860
79 4,875,861
4,875,862
4,875,863
100 4,875,864
101 4,875,865
140 4,875,866
157 4,875,867
188 4,875,868
189 4,875,869
204 4,875,870
209 4,875,871
344 4,875,872
347 4,875,873
364 4,875,874
401 4,875,875
431 4,875,876
497 4,875,877
501 4,875,878
4,875,879
535 4,875,881
536 4,875,880

CLASS 440

66 4,875,882
77 4,875,883
88 4,875,884

CLASS 446

189 4,875,885
298 4,875,886
314 4,875,887
392 4,875,888

CLASS 455

2 4,876,736
12 4,876,737
33 4,876,738
4,876,740
47 4,876,741
66 4,876,742
133 4,876,743
266 4,876,739
326 4,876,744

CLASS 460

1 4,875,889
68 4,875,890
110 4,875,891

CLASS 474

17 4,875,892
28 4,875,893
49 4,875,894

CLASS 493

117 4,875,895

CLASS 501

89 4,876,226
97 4,876,227

CLASS 502

71 4,876,228
107 4,876,229
171 4,876,230
174 4,876,231
417 4,876,232

CLASS 503

209 4,876,233
227 4,876,234
4,876,235
4,876,236
4,876,237
4,876,238

CLASS 505

1 4,876,239
4,876,240

CLASS 514

2 4,876,241
3 4,876,242
11 4,876,243
19 4,876,244
29 4,876,245
80 4,876,246
89 4,876,247
108 4,876,248
174 4,876,249
179 4,876,250
193 4,876,251
224.8 4,876,252
241 4,876,253
252 4,876,254
4,876,255
4,876,256
253 4,876,257

CLASSIFICATION OF PATENTS

254 4,876,258
256 4,876,259
278 4,876,260
307 4,876,261
318 4,876,262
338 4,876,263
345 4,876,264
370 4,876,265
392 4,876,266
415 4,876,267
425 4,876,268
429 4,876,269
439 4,876,270
443 4,876,271
450 4,876,272
451 4,876,273
452 4,876,274
4,876,275
454 4,876,276
465 4,876,277
494 4,876,278
510 4,876,279
4,876,280
517 4,876,281
554 4,876,282
562 4,876,283
570 4,876,366
657 4,876,284
746 4,876,285

CLASS 518

700 4,876,286

CLASS 521

28 4,876,287
53 4,876,288
54 4,876,289
76 4,876,290
124 4,876,291
159 4,876,292

CLASS 523

122 4,876,293
139 4,876,294
172 4,876,295
200 4,876,296
351 4,876,297
433 4,876,298

CLASS 524

99 4,876,299
100 4,876,300
109 4,876,309
255 4,876,301
267 4,876,302
296 4,876,303
314 4,876,304
401 4,876,305
423 4,876,306
612 4,876,307
780 4,876,308

CLASS 525

149 4,876,310
229 4,876,311
263 4,876,312
281 4,876,313
338 4,876,314
346 4,876,315
427 4,876,316
433 4,876,317
446 4,876,318
456 4,876,319

CLASS 526

62 4,876,320
129 4,876,321
242 4,876,322
310 4,876,323

CLASS 528

142 4,876,324
170 4,876,325
173 4,876,327
272 4,876,326
322 4,876,328
353 4,876,329
4,876,330
361 4,876,331

CLASS 530

326 4,876,332
387 4,876,199

CLASS 534

575 4,876,333
632 4,876,334

CLASS 536

27 4,876,335
109 4,876,336

CLASS 540

357 4,876,338
450 4,876,339
461 4,876,340

CLASS 544

2 4,876,341
14 4,876,342
168 4,876,343
219 4,876,344
379 4,876,345

CLASS 546

172 4,876,346
176 4,876,347
252 4,876,348
350 4,876,349

CLASS 548

110 4,876,350
204 4,876,351
232 4,876,352
262 4,876,353
341 4,876,354
352 4,876,355
419 4,876,356
463 4,876,357
521 4,876,358
533 4,876,359
550 4,876,360

CLASS 549

41 4,876,361
59 4,876,362
214 4,876,364
215 4,876,363
4,876,365
349 4,876,367
374 4,876,368
411 4,876,369
455 4,876,370
517 4,876,371
529 4,876,372

CLASS 556

415 4,876,337
453 4,876,373

CLASS 558

109 4,876,374
235 4,876,375
412 4,876,376
416 4,876,377

CLASS 560

56 4,876,381
78 4,876,378
109 4,876,382
158 4,876,379
163 4,876,383
224 4,876,384
352 4,876,380

CLASS 562

41 4,876,047
414 4,876,385
4,876,386
493 4,876,387

CLASS 564

437 4,876,388

CLASS 568

26 4,876,389
34 4,876,390
404 4,876,392
415 4,876,393
697 4,876,394
724 4,876,391
728 4,876,395
779 4,876,396
798 4,876,397
804 4,876,398
817 4,876,399
824 4,876,400
861 4,876,401
881 4,876,402
913 4,876,403

CLASS 570

145 4,876,404
156 4,876,405
165 4,876,406
239 4,876,407

CLASS 585

467 4,876,408
500 4,876,409
516 4,876,410
533 4,876,411
640 4,876,412

CLASS 604

187 4,875,896
283 4,875,897
331 4,875,898
333 4,875,899

CLASSIFICATION OF DESIGNS

D2— 275 304,125
293 304,126
314 304,127
304,128
D3— 23 304,129
63 304,130
72 304,131
100 304,132
D6— 420 304,133
421 304,134
477 304,135
515 304,136
569 304,137
D7— 17 304,138
43 304,139
49 304,140
304,141
53 304,142
70 304,143
102 304,144
104 304,145
317 304,146
350 304,147
351 304,148
304,149
304,150
D8— 30 304,151
68 304,152
93 304,153
99 304,154
303 304,155
314 304,156
D9— 347 304,157
375 304,158
304,159
433 304,160
D10— 21 304,161
41 304,162
116 304,163
D11— 131 304,164
202 304,165
D12— 143 304,166
156 304,167
157 304,168
D13— 1 304,169
4 304,170
304,171
8 304,172
13 304,173
31 304,174
D14— 100 304,175
102 304,176
107 304,177
109 304,178
113 304,179
114 304,180
116 304,181
118 304,182
304,183
304,184
304,185
304,186
304,187
138 304,188
142 304,190
147 304,189
191 304,192
192 304,191
240 304,193
257 304,194
265 304,195
D15— 1 304,196
9 304,197
9.1 304,198
126 304,199
140 304,200
D16— 202 304,201
204 304,202
D18— 13 304,203
37 304,204
D19— 65 304,205
86 304,206
D20— 2 304,207
D21— 34 304,209
41 304,208
81 304,210
91 304,211
108 304,212
304,213
304,214
304,215
304,216
304,217
304,218
116 304,219
141 304,220
304,221
192 304,222
D22— 108 304,223
D23— 245 304,224
257 304,225
267 304,226
344 304,227
353 304,228
377 304,229
386 304,230
D24— 15 304,231
17 304,232
21 304,233
27 304,234
38 304,235
304,236
45 304,237
49 304,238
51 304,239
D25— 1 304,240
D26— 3 304,241
4 304,243
65 304,242
D28— 2 304,244
73 304,245
D30— 102 304,246
304,247
162 304,248
D32— 18 304,249
304,250
21 304,251
37 304,252
D34— 6 304,253
33 304,254

CLASSIFICATION OF PLANTS

P.— 41 7,049
7,050

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,875,374
4,876,002
4,876,140
4,876,317
02 : 4,875,599
04 : 4,875,300
4,875,526
4,875,668
4,875,713
4,875,730
4,875,731
4,876,051
4,876,217
4,876,516
4,876,518
4,876,639
4,876,643
4,876,662
06 : Re.33,100
4,875,242
4,875,266
4,875,271
4,875,274
4,875,278
4,875,282
4,875,291
4,875,302
4,875,305
4,875,314
4,875,346
4,875,352
4,875,394
4,875,395
4,875,408
4,875,409
4,875,451
4,875,459
4,875,466
4,875,469
4,875,470
4,875,487
4,875,489
4,875,492
4,875,497
4,875,529
4,875,547
4,875,588
4,875,595
4,875,598
4,875,602
4,875,612
4,875,617
4,875,620
4,875,634
4,875,649
4,875,666
4,875,672
4,875,677
4,875,678
4,875,689
4,875,691
4,875,694
4,875,708
4,875,737
4,875,744
4,875,751
4,875,767
4,875,769
4,875,770
4,875,774
4,875,775
4,875,778
4,875,779
4,875,824
4,875,825
4,875,859
4,875,897
4,875,906
4,875,953
4,875,957
4,875,966
4,875,982
4,875,996
4,876,041
4,876,050
4,876,063
4,876,066
4,876,089
4,876,093
4,876,096
4,876,105
4,876,116
4,876,117
4,876,151
4,876,153
4,876,178
4,876,188
4,876,190
4,876,197
4,876,208
4,876,209
4,876,211
4,876,215
4,876,216
4,876,220
4,876,225
4,876,249
4,876,277
4,876,328
4,876,408
4,876,425
4,876,428
4,876,440
4,876,453
4,876,460
4,876,485
4,876,497
4,876,509
4,876,517
4,876,519
4,876,534
4,876,547
4,876,554
4,876,583
4,876,586
4,876,596
4,876,602
4,876,632
4,876,640
4,876,654
4,876,660
4,876,663
4,876,668
4,876,685
4,876,687
4,876,688
4,876,691
4,876,693
4,876,701
4,876,712
4,876,726
4,876,728
4,876,739
08 : 4,875,462
4,875,467
4,875,861
4,875,894
4,876,491
4,876,520
4,876,702
4,876,717
09 : 4,875,246
4,875,364
4,875,549
4,875,579
4,875,675
4,875,722
4,875,785
4,875,816
4,875,830
4,875,933
4,875,956
4,875,965
4,876,003
4,876,005
4,876,162
4,876,296
4,876,367
4,876,394
4,876,622
4,876,652
4,876,658
10 : 4,875,858
4,876,128
4,876,210
4,876,259
4,876,293
12 : 4,875,239
4,875,247
4,875,298
4,875,373
4,875,428
4,875,430
4,875,481
4,875,483
4,875,622
4,875,673
4,875,805
4,875,819
4,875,856
4,875,874
4,875,936
4,876,090
4,876,399
4,876,505
4,876,549
4,876,565
4,876,579
4,876,589
4,876,592
4,876,624
4,876,634
4,876,736
4,876,737
13 : 4,875,301
4,875,508
4,875,592
4,875,783
4,875,803
4,875,916
4,875,952
4,875,969
4,876,010
4,876,291
4,876,303
4,876,424
15 : 4,875,630
4,875,886
16 : 4,875,310
4,875,504
4,876,101
17 : 4,875,257
4,875,316
4,875,350
4,875,397
4,875,403
4,875,412
4,875,460
4,875,478
4,875,486
4,875,499
4,875,569
4,875,591
4,875,601
4,875,627
4,875,669
4,875,792
4,875,793
4,875,818
4,875,826
4,875,829
4,875,868
4,875,871
4,875,881
4,875,885
4,875,891
4,875,935
4,875,991
4,876,091
4,876,152
4,876,192
4,876,241
4,876,268
4,876,329
4,876,379
4,876,385
4,876,386
4,876,390
4,876,414
4,876,459
4,876,480
4,876,486
4,876,499
4,876,514
4,876,552
4,876,621
4,876,626
4,876,648
4,876,656
4,876,709
4,876,718
4,876,740
18 : 4,875,441
4,875,474
4,875,662
4,875,685
4,875,697
4,876,273
4,876,282
4,876,309
4,876,316
4,876,391
4,876,395
4,876,638
19 : 4,875,235
4,875,324
4,875,330
4,875,375
4,875,421
4,875,527
4,875,563
4,875,701
4,875,852
20 : 4,875,552
4,875,553
4,875,692
4,875,847
4,876,435
4,876,530
21 : 4,875,251
4,875,272
4,875,277
4,875,351
4,875,410
4,875,688
4,875,796
4,875,841
4,875,914
4,876,138
4,876,483
4,876,492
22 : 4,875,323
4,875,427
4,875,593
4,875,992
4,876,017
4,876,193
23 : 4,875,581

4,875,743
4,876,436
4,876,713
24 : 4,875,289
4,875,309
4,875,366
4,875,879
4,875,938
4,875,948
4,875,949
4,876,000
4,876,232
4,876,550
4,876,659
25 : 4,875,281
4,875,288
4,875,358
4,875,520
4,875,546
4,875,625
4,875,635
4,875,880
4,875,887
4,875,919
4,876,053
4,876,423
4,876,455
4,876,501
4,876,525
4,876,533
4,876,541
4,876,566
4,876,628
4,876,742
26 : 4,875,245
4,875,295
4,875,318
4,875,327
4,875,385
4,875,391
4,875,399
4,875,537
4,875,583
4,875,590
4,875,631
4,875,653
4,875,700
4,875,715
4,875,723
4,875,728
4,875,735
4,875,777
4,875,781
4,875,791
4,875,812
4,875,838
4,875,840
4,876,014
4,876,039
4,876,154
4,876,312
4,876,343
4,876,594
4,876,629
27 : 4,875,259
4,875,340
4,875,464
4,875,472
4,875,476
4,875,609
4,875,621
4,875,629
4,875,732
4,875,755
4,875,760
4,875,798
4,875,821
4,875,895
4,875,901
4,875,972
4,875,973
4,876,011

4,876,099
4,876,109
4,876,123
4,876,136
4,876,149
4,876,332
4,876,427
4,876,444
4,876,700
29 : 4,875,238
4,875,417
4,875,458
4,875,714
4,875,745
4,875,801
4,875,851
4,876,165
4,876,243
4,876,323
4,876,375
30 : 4,875,576
4,875,997
31 : 4,875,269
4,875,431
4,875,813
32 : 4,875,514
4,875,651
4,875,915
4,876,206
33 : Re.33,098
4,875,283
4,876,431
34 : Re.33,101
4,875,268
4,875,287
4,875,304
4,875,326
4,875,404
4,875,435
4,875,473
4,875,521
4,875,554
4,875,603
4,875,695
4,875,753
4,875,754
4,875,808
4,875,876
4,875,994
4,875,995
4,876,087
4,876,095
4,876,102
4,876,106
4,876,127
4,876,228
4,876,229
4,876,242
4,876,256
4,876,257
4,876,272
4,876,280
4,876,285
4,876,333
4,876,336
4,876,338
4,876,352
4,876,364
4,876,365
4,876,368
4,876,384
4,876,392
4,876,411
4,876,430
4,876,447
4,876,457
4,876,488
4,876,495
4,876,545
4,876,546
4,876,627
4,876,667

4,876,724
35 : 4,875,998
4,876,032
4,876,115
4,876,651
36 : 4,875,240
4,875,262
4,875,319
4,875,321
4,875,341
4,875,389
4,875,411
4,875,468
4,875,482
4,875,550
4,875,561
4,875,611
4,875,614
4,875,638
4,875,671
4,875,682
4,875,707
4,875,709
4,875,725
4,875,729
4,875,756
4,875,764
4,875,765
4,875,772
4,875,773
4,875,788
4,875,795
4,875,866
4,875,917
4,875,968
4,875,999
4,876,013
4,876,018
4,876,031
4,876,064
4,876,104
4,876,120
4,876,142
4,876,159
4,876,166
4,876,167
4,876,169
4,876,175
4,876,176
4,876,181
4,876,201
4,876,207
4,876,212
4,876,227
4,876,234
4,876,235
4,876,236
4,876,237
4,876,238
4,876,240
4,876,252
4,876,300
4,876,387
4,876,413
4,876,445
4,876,548
4,876,561
4,876,575
4,876,590
4,876,607
4,876,608
4,876,635
4,876,697
4,876,731
4,876,733
4,876,741
37 : 4,875,365
4,875,396
4,875,401
4,875,780
4,875,782
4,875,863

4,875,875
4,876,521
4,876,532
4,876,644
4,876,653
4,876,735
39 : 4,875,252
4,875,339
4,875,343
4,875,361
4,875,363
4,875,376
4,875,380
4,875,383
4,875,440
4,875,575
4,875,585
4,875,594
4,875,644
4,875,655
4,875,676
4,875,693
4,875,794
4,875,799
4,875,815
4,875,878
4,875,974
4,875,979
4,875,988
4,876,015
4,876,046
4,876,094
4,876,172
4,876,294
4,876,304
4,876,305
4,876,308
4,876,315
4,876,326
4,876,348
4,876,355
4,876,374
4,876,416
4,876,582
4,876,647
4,876,664
4,588,627
40 : 4,875,243
4,875,290
4,875,348
4,875,524
4,875,530
4,875,639
4,876,016
4,876,030
4,876,321
4,876,410
4,876,449
4,876,539
41 : 4,875,386
4,875,424
4,875,619
4,875,650
4,875,661
4,875,718
4,875,854
4,876,009
4,876,214
4,876,287
4,876,484
4,876,655
42 : 4,875,275
4,875,279
4,875,311
4,875,436
4,875,461
4,875,551
4,875,683
4,875,696
4,875,739
4,875,822
4,875,865

4,875,877
4,875,890
4,875,912
4,876,044
4,876,048
4,876,058
4,876,061
4,876,131
4,876,163
4,876,231
4,876,269
4,876,271
4,876,279
4,876,292
4,876,313
4,876,346
4,876,366
4,876,377
4,876,409
4,876,421
4,876,494
4,876,498
4,876,502
4,876,506
4,876,526
4,876,593
4,876,625
44 : 4,875,574
4,875,888
45 : 4,875,292
4,875,528
4,875,587
4,875,786
4,875,920
46 : 4,876,674
47 : 4,875,241
4,875,294
4,875,320
4,875,616
4,875,680
4,876,378
4,876,463
4,876,721
48 : 4,875,236
4,875,368
4,875,369
4,875,398
4,875,413
4,875,420
4,875,432
4,875,498
4,875,502
4,875,525
4,875,532
4,875,544
4,875,545
4,875,710
4,875,719
4,875,800
4,875,811
4,875,896
4,875,905
4,875,934
4,875,941
4,875,989
4,876,019
4,876,075
4,876,076
4,876,124
4,876,156
4,876,213
4,876,222
4,876,226
4,876,230
4,876,250
4,876,295
4,876,307
4,876,314
4,876,318
4,876,320
4,876,358
4,876,380

4,876,397
4,876,402
4,876,415
4,876,426
4,876,450
4,876,465
4,876,511
4,876,512
4,876,538
4,876,542
4,876,543
4,876,630
4,876,642
4,876,671
4,876,672
4,876,673
4,876,699
4,876,710
49 : 4,875,303
4,875,717
4,876,110
4,876,148
50 : 4,875,637
4,875,674
4,876,114
51 : 4,875,255
4,875,357
4,875,495
4,875,573
4,875,580
4,875,623
4,875,802
4,875,814
4,876,068
4,876,121
4,876,692
53 : 4,875,237
4,875,254
4,875,296
4,875,372
4,875,419
4,875,645
4,875,667
4,875,687
4,875,867
4,876,043
4,876,081
4,876,186
4,876,199
4,876,515
4,876,598
4,876,684
54 : 4,875,463
4,875,597
4,876,080
55 : 4,875,344
4,875,439
4,875,448
4,875,457
4,875,465
4,875,491
4,875,517
4,875,608
4,875,626
4,875,656
4,875,864
4,875,882
4,875,883
4,875,884
4,875,921
4,875,976
4,875,985
4,876,072
4,876,108
4,876,325
4,876,461
4,876,468
4,876,475
4,876,513
4,876,711
4,876,715

DESIGN PATENTS

04 : 304,235
06 : 304,133
304,136
304,142
304,154
304,156
304,174
304,208
304,216
304,217
304,218
304,225
304,229

304,245
304,250
08 : 304,200
304,231
304,232
09 : 304,155
304,207
304,234
11 : 304,253
12 : 304,135
304,178
304,210

304,233
13 : 304,165
304,168
304,180
17 : 304,137
304,189
304,224
304,248
304,251
18 : 304,194
19 : 304,240
22 : 304,196

23 : 304,164
24 : 304,167
304,199
25 : 304,152
304,176
304,238
304,243
26 : 304,143
27 : 304,153
304,219
33 : 304,132
304,223

34 : 304,139
304,157
304,158
304,159
304,214
304,239
37 : 304,151
304,179
39 : 304,162
304,198
40 : 304,126
41 : 304,127

304,128
42 : 304,209
48 : 304,246
304,247
304,252
49 : 304,129
51 : 304,195
304,226
53 : 304,130
304,222
55 : 304,212
304,236

PLANT PATENTS

06 : 7,049
7,050

U.S. GOVERNMENT PRINTING OFFICE : O—1989

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Donald J. Quigg, *Commissioner*